Bohnenstingl

Special Surveying Equipment

Complete Catalogue - English











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Special Surveying Equipment
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Catalogue Content

Navigation

Instead of a printed catalogue we offer you the option to work with a **fully linked catalogue**.
Every time you find a **page number marked turquoise (this color)**, you can jump to this page by clicking on it.
So you can quickly find related content and additional accessories.

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

Also you can use the **icons** on the bottom of each page, which help you with the navigation through the catalogue.

Table of contents | Print page | previous page | next page | step back | step forward

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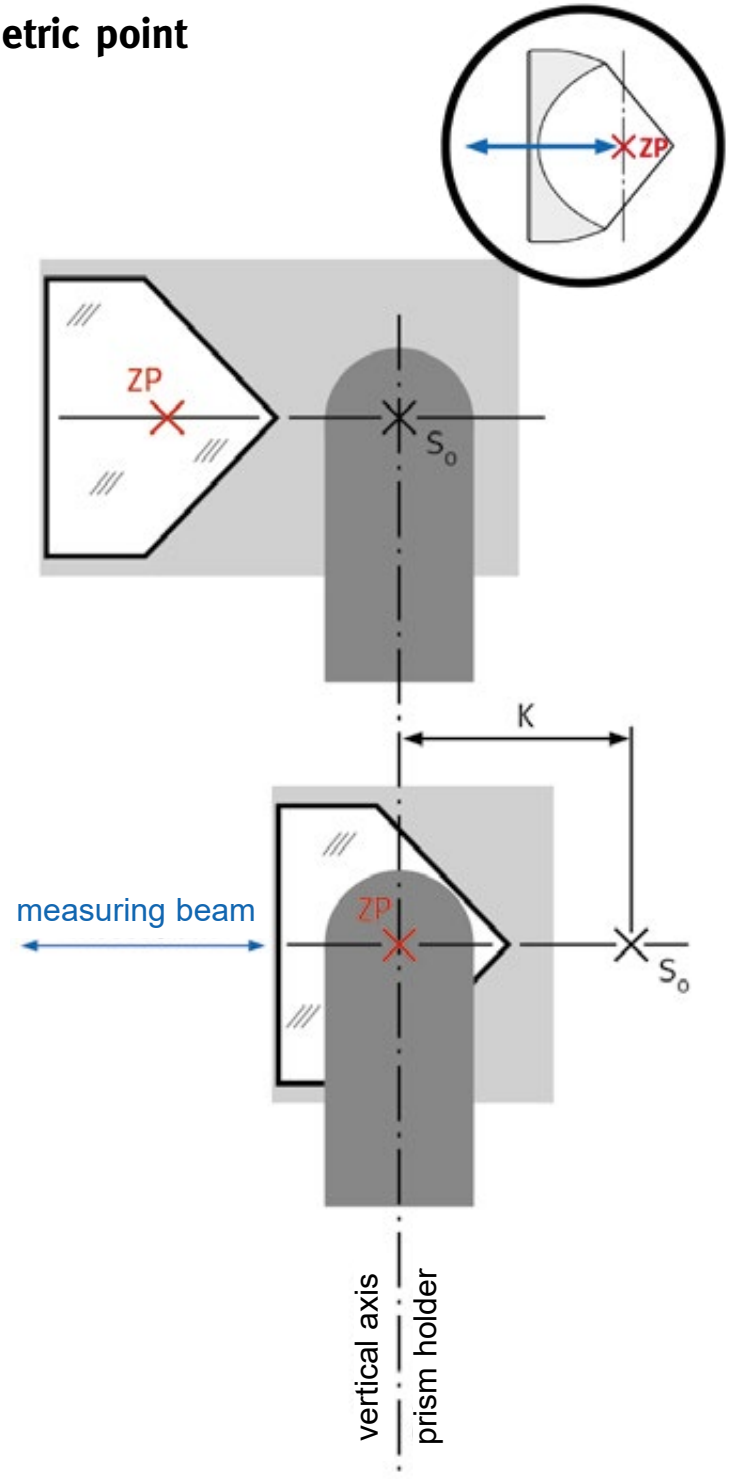
Prism constant and central symmetric point

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 $\mathbf{S_o}$ of the measuring beam. If the standing axis is realized exactly in this point $\mathbf{S_o}$ (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 $\mathbf{S_o}$. 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:

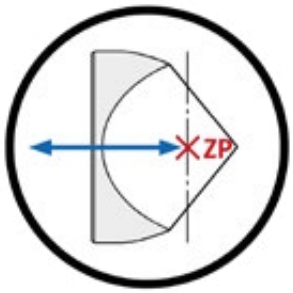
If a non-Leica prism, where the true prism constant is given, is to be used with a Leica total station, 34.4 mm must be added. Example of a non-Leica prism with a true constant of K = -30 mm:
-30.0 mm +34.4 mm = **+4.4 mm**. This must be set on the Leica total station.

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.

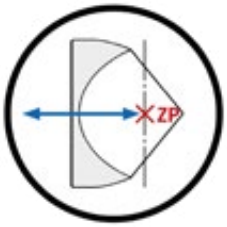


Standard prisms and small prisms with adapted prism constant

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.

Prism-/Reflector Type Standard	prism constant K in mm		● ○ **available by Bohnenstingl** Prisms and Reflectors												
	physic. constant, used by all manufacturers except LEICA	constant as defined by LEICA	Prism Series HIP	Prism and reflec. foils on L-carrier	Prism Series ONRT	„Rundum"-Prism 6x60°	360°-Prism Medium Format	Precision Prism 17.5	PP 17,5 for concrete bevels	Ball prism Ø 30 mm and 1.5"	Prism on L-holder with magn. base	Ball prism, indust. 3D-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	●	●	○			○	○						
Topcon 360°-Prism A7	**-2**	+32,4													
Trimble 360°-Prism for Zeiss S10	**-3**	+31,4													
Leica 360° Mini GRZ101	**-4,4**	+30													
360°-Prism Medium Format	**-6**	+28,4					○								
Leica MPR122 360°-Prism	**-6,3**	+28,1													
TOPCON/Sokkia 360°-Prism ATP1/ATP1 S	**-7**	+27,4													
Leica 360°-Prism GRZ4, GRZ121, GRZ122	**-11,3**	+23,1	●	●	○	●				●	●	●	●		●
Leica Mini GMP101, GMP 111	**-16,9**	+17,5	●	●	●					●	●	●	●	●	
Prisms by Nikon, Sokkia, Topcon etc.	**-30**	+4,4	●	●	○						●				
Leica Standard prism GPH1P, GPR121, GPR1, GPH1	**-34,4**	0	●	●	○						●				
Trimble (Zeiss ETR, KTR, KTO, KTM)	**-35**	-0,6	●	●	○						●				



● = Mounting of the prism/reflector at the centrally symmetrical point (visible center). A prism that is not aligned accurately with the total station has the minimum effect on angle and distance measurements. This is of great advantage if only the prism center is available as a target for measurements or if automatic target determination is carried out on it.
With these prisms precision measurements can be performed.

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

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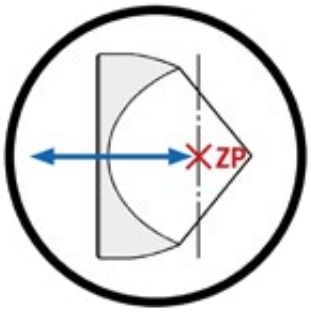
Leica GRZ4 Leica GRZ122

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.

HIP Prism

ONRT Prism

L-Bar Prism

Monitoring Systems

Industr. 3D-Measurements

Wall and ground points

RUNDUM Prisma

Mini-Vektor

Twin-Systems

Sewer Surveying System

Cylinder Prism ZP11

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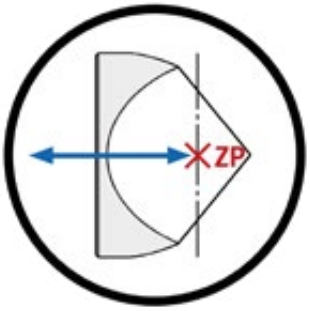
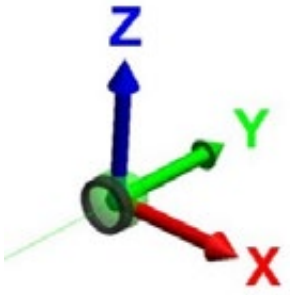
Error when aligning prism towards total station



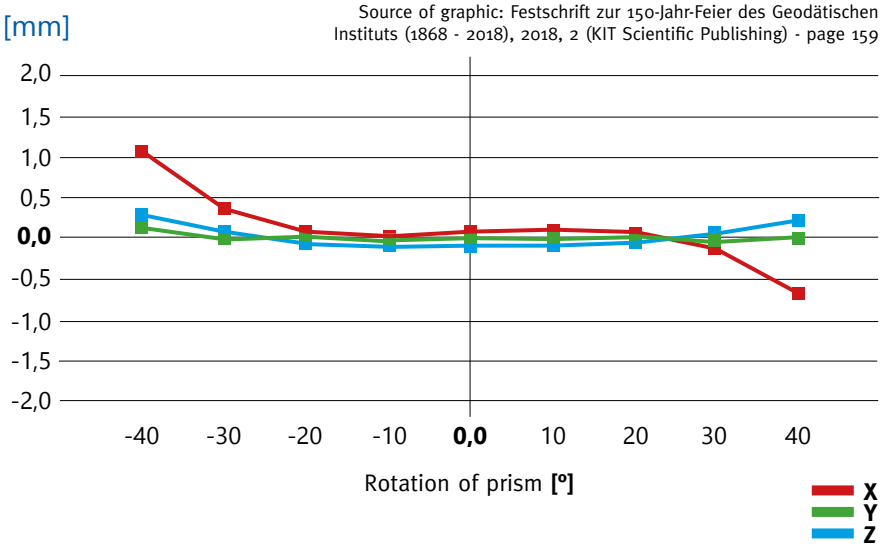
If the prism is not exactly aligned to the tachymeter, errors occur in the angle and distance measurement. These errors are lowest if the vertical axis of a prism carrier runs through the central symmetrical point of the prism, or if the centre of the sphere and the central symmetrical point of the prism are identical in the case of a prism built into a sphere.
This is the case with all our ball prisms. The Institute of Technology Karlsruhe has used a laser tracker to analyze the effects of a ball prism that is not exactly aligned with the instrument (ball 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 top.

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

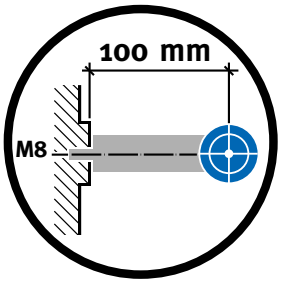


Reference system

Source of graphic: Festschrift zur 150-Jahr-Feier des Geodätischen Instituts (1868 - 2018), 2018, 2 (KIT Scientific Publishing) - page 159



The Y-value shows the effect of the rotation on the **distance measurement**. It is marginal even with a misalignment of up to 40° and remains below 0.1 mm.
For the **angle measurement**, however, this only applies to a rotation of up to 20°. With a larger rotation, the ball centre "wanders" disproportionately strongly. In the case of an extreme misalignment of approx. 45° (shortly before the prism centre is no longer visible and therefore measurement is no longer possible), deviations of the order of 1 mm occur.



M8 wall bolt / target distance 100 mm

Application

Marking of survey points with wall bolts (M8 inner thread):

- In cadastral and engineering surveying as connection points instead of ground points
- For building control measurements as object points to be tested or for fastening surveying instruments to the wall/structure

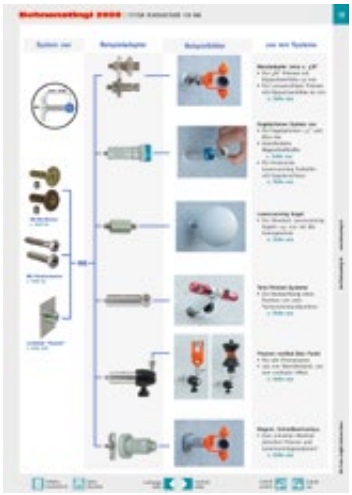
Concept

- By screwing the wall adapter with the corresponding target (including prism) into the M8 wall bolt, the prism is **force-centred in position** (X, Y) and height (Z) at the nominal point

AdV Version (Germany)

- The points have an **M8 internal thread**. A hole must be drilled for bolts. Then they can be inserted into the building using the dowel or mortar method. Modern injection mortars (2-component basis) have also proven their worth. Without drilling, i.e. non-destructively, steel cylinders with M8 internal threads can be fastened to the building structure on platforms made of perforated sheet metal using assembly adhesive
- The measurement setpoint 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

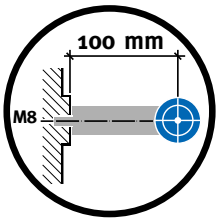
Helpful overviews



■ **Adapters in M8 thread** s. next page 8

■ **Quick change system with M8-centering-plates,** s. page 223

System 100



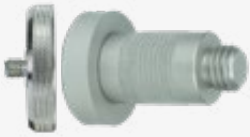
M8 wall bolt
s. page 100

M8 precision bolts
s. page 102

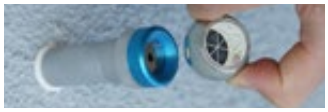
Plate "Fixed point"
s. page 101

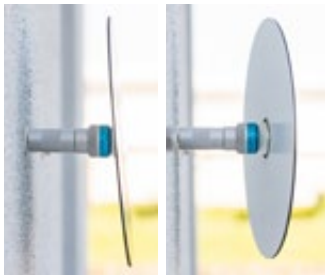
M8

Example Adapters



Example Images





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 52

Laserscan. Target Pocket
- with standard tilting axis height of Leica prisms

s. page 219

Ball prism System 100
- For ball prisms Ø1.5“ and Ø30 mm
- Various magnetic forces

s. page 76

- For circular laser scanning targetswith ball connection

s. page 236

Laserscanning Sphere Target
- For standard laser scanning spheres 145 mm with M8 internal thread

s. page 224

Twin-Prism-Systems
- To monitor a point from two tachymeter positions

s. page 94

Prism vetically above a point
- Adapter for all commercial prisms available

s. page 97

Magnet. quick change system
- For fast switching between prisms and laser scanning equipment

s. page 223

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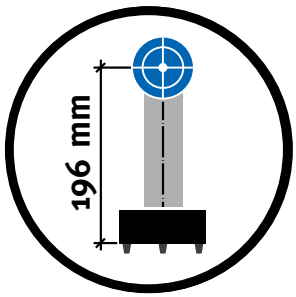
Tribrachs for surveying instruments / tilting axis and target height



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
- **Compatibility:** Possibility to use instruments and targets of different manufacturers in one tripod type
- **Levelling:** The upper part of the tribrach and thus the instrument or the target holder can be leveled with 3 adjusting screws.
- **Forced centering:** After removing the instrument or the target from the tribrach and reinserting it, they are again in exactly the same position on the tripod. The standing axes of different devices are identical within very small limits.

Different types: The tripod with claw system of the former company WILD has found the largest spreading. On the underside of the instrument/target sign there is a cylinder with 3 claws which are inserted and secured in the tribrach.
In addition, there are tribrachs with the so-called DIN pin Ø34 mm (formerly ZEISS) or, very rarely still, tribrachs from the former KERN company.

Tilting axis/target height 196 mm with the claw system

The **tilt axis height** is the distance from the underside of the instrument to the tilt axis of the tachymeter telescope. In the claw system it is measured from the cylindrical underside of the tachymeter resting on the tripod. The 3 claws are disregarded.

The **tilting axis height** of the tachymeters of many manufacturers is **196** mm (e.g. Leica, Trimble etc.).
The advantage of a tribrach is the possibility of levelling the horizon as well as the very fast, force-centered exchange of tachymeter and target. If the centre of the aiming point also has a distance of 196 mm to the underside of the claw insert, height transmissions can be carried out very precisely without having to take an offset into account.

When using tachymeters with other tilting axis heights, appropriate height compensation adapters must be used or the difference in height must be taken into account mathematically.

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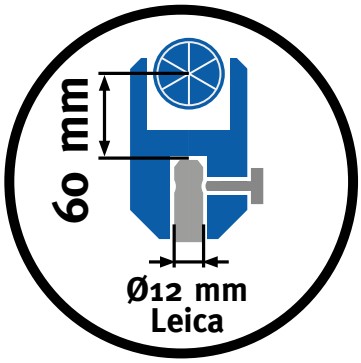
Thread connections and Quick connections Ø12 mm (LEICA)

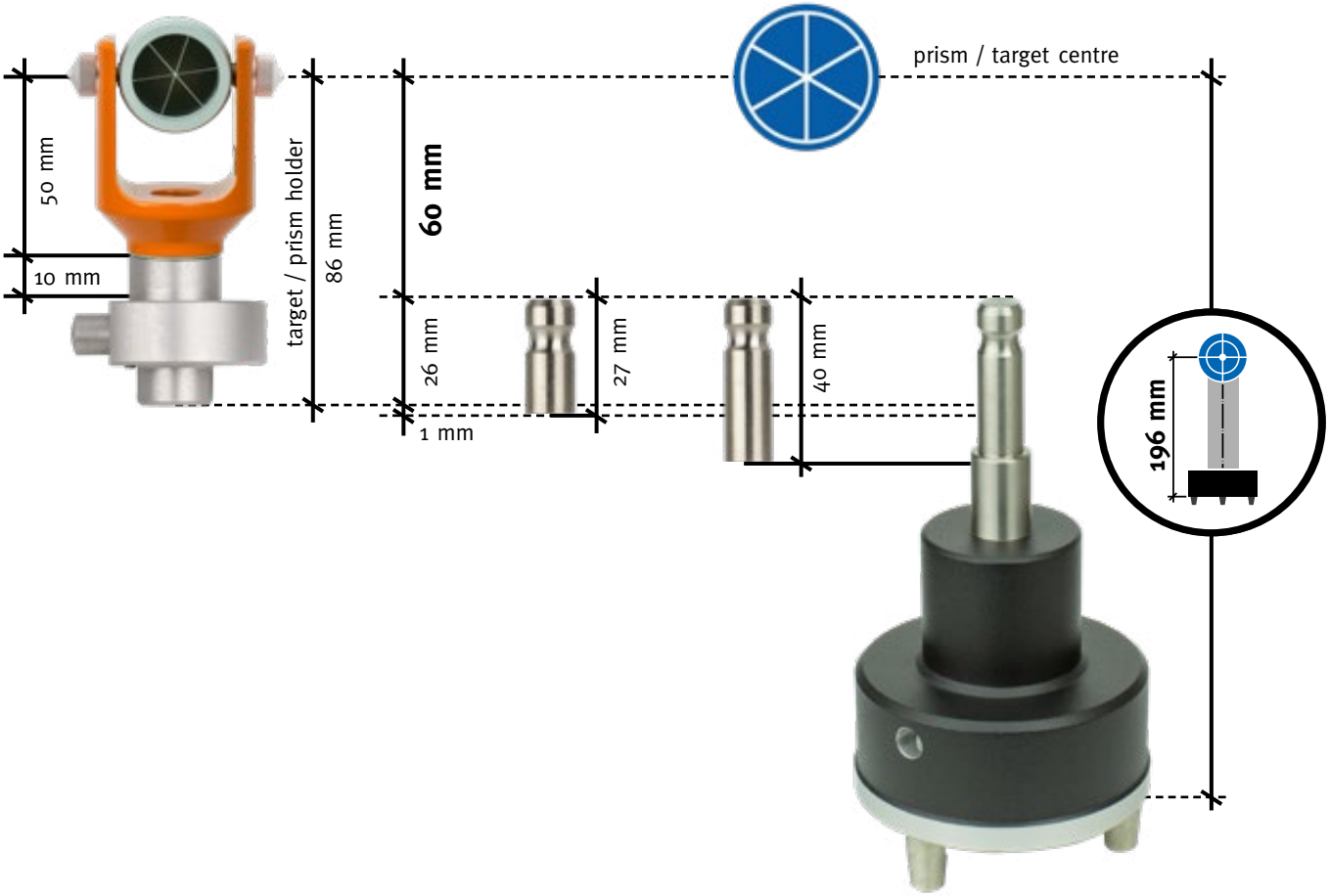


There are also quasi standards for the assembly of surveying accessories. The 5/8" thread has become established for threaded connections. While it was initially mainly known for screwing tribrachs onto the instrument stand, it can now be found in all types of screw connections. The main advantage of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



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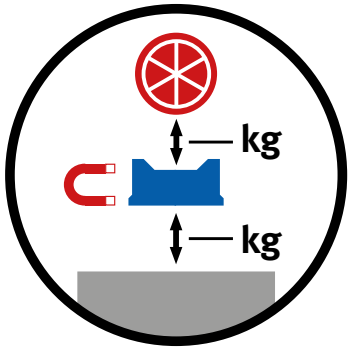
Ball bases with magnet - Two holding forces



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.

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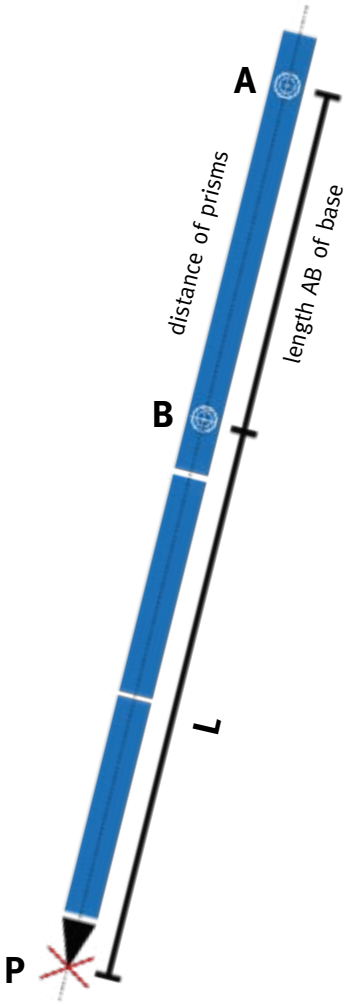
Determination of hidden points with the Two-prism method aka. "Vector" method

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 s. page 143

- Survey of manhole low points
- (manhole bottoms, inlets, etc.)
- Object points hidden by obstacles
- Inside corners of rooms
- etc.

Mini-Vectors

- Accurate determination of not directly visible object points
- Industrial surveying
- Precision surveying

- **One-unit-Vector** s. page 105
- **Modular Mini-Vector** s. page 105
- **Mini-Vector Telescope** s. page 105

Software solutions for vector method

Many electronic total stations already have a program for measuring concealed points (often called: sewer measuring pole) integrated as standard.
It does not matter whether the vector system for sewer measurements or the small mini-vectors are used - the principle is always the same.

Required parameters for the calculation of 3D coordinates are:

- Prism constant K
- Base length AB (distance between the two prisms)
- Extension dimension L (distance from the lower prism to the pole tip)

Please note that "pole length" may be defined differently by different total station manufacturers or software providers. To increase the accuracy, it is often possible to determine the base with 3 prisms instead of 2. For this purpose, we offer corresponding expansion options for the channel measuring system Vektor and the "Mini-Vektor Modular".

Products

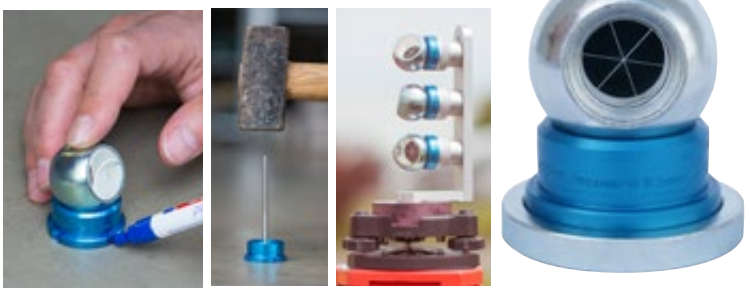
Page 1 of 5

A Prisms & Accessories page 18

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

B Monitoring & Tunneling page 61

- Ball prism System
- L-Bar prims
- MoniPro System
- Prisms vertically above measuring point
- Twin-Systems (two prisms)



Products

Page 2 of 5

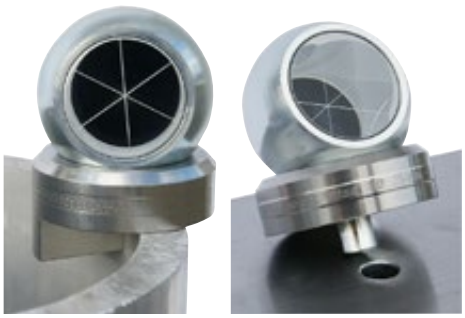
C Precision measurements page 103

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











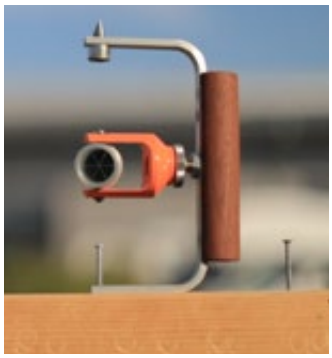
D Batter boards page 136

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







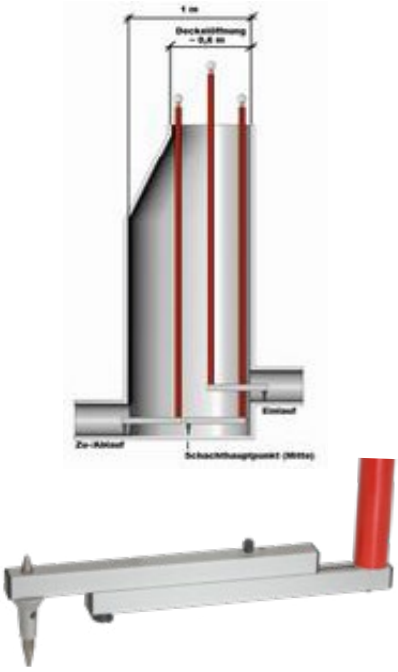



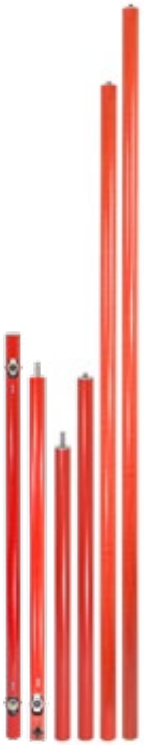

Products

Page 3 of 5

E Sewer Surveying System page 143

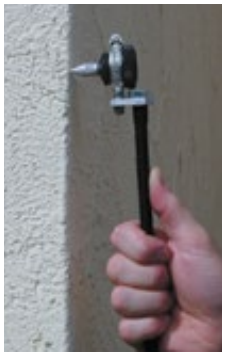
- System Vektor
- Boom for measuring inlets and outlets
- Tripod for sewer measuring pole





F Building / structure surveying page 156

- Offsets for building corners
- Goose neck prism holder
- Precision prism 17.5
- Chamfer angle



Products

Page 4 of 5

G Track and Rail Surveying page 161

- Surveying of bolts
- Rail Angle SW Pro
- Track Gauge







H Computer Holders page 172

Products

Page 5 of 5

I Laserscanning page 215

- 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

J General Surveying Accessories page 248

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

K Adapters & Extensions page 279

Prisms & Accessories

Page 1 of 2

A.1 Mini Prism Series HIP page 20

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

A.2 Holder series ONRT for MP 24 page 28

- Mini Prism MP 24
- Holder with 5/8" thread / Leica
- Offset Spikes
- MP 24 mounted on ranging pole

A.3 Cylinder Prism ZP11 page 35

A.4 360°-Prism & Accessories page 38

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

Prisms & Accessories

Page 2 of 2

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

Prisms & Accessories

Mini Prism - Series HIP

A.1.1 General Information - Series HIP page 21

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

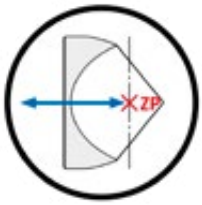


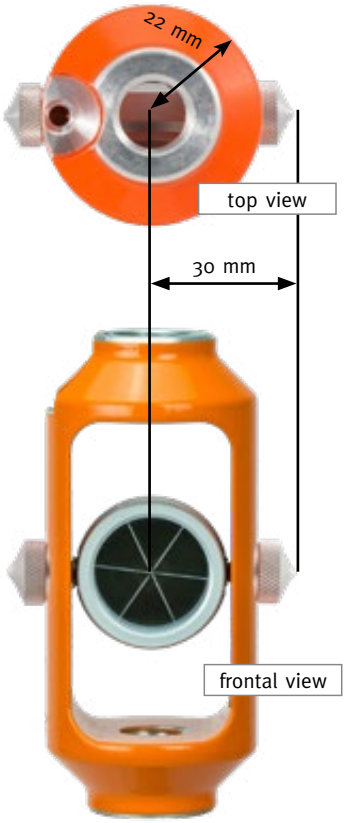

A.1.2 Prism holders with 5/8" threads page 22

A.1.3 Prism holders with Leica sockets page 24

A.1.4 Offset spikes for Series HIP page 26

Mini Prism & Holder: Series HIP





The **Prism HIP** (**H**ighly-**I**ntegrated-**P**rism) **is characterised as follows**:

- Adjustable tilting resistance of the prism
- Low space requirement of the prism carrier (radius only 22 mm)
- Glass Ø = 25 mm, except with prism constant K = -11,3 mm: glass Ø = 17,5 mm
- Distance measurement range up to more than 1000 m depending on device and weather conditions
- Mirrored reflective surfaces; no „tarnishing“ of the prism in the housing
- Highest precision due to complete CNC machining (no mould)
- Various matching accessories
- Target plate with reflective foil (26 x 40 mm) as an inexpensive alternative to glass prisms

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

INFO 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

Tilting axis covers / pins

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

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

Red marked prism center

For a better manual targeting with the tachymeter we deliver the series HIP optionally with a red marked prism center. **Additional charge: 10,- € / prism**
Please contact us for this option.

Circular Level

Various circular levels are available on s. page 50.

Protective Cap

Protective cap for heavy weather conditions s. page 27.

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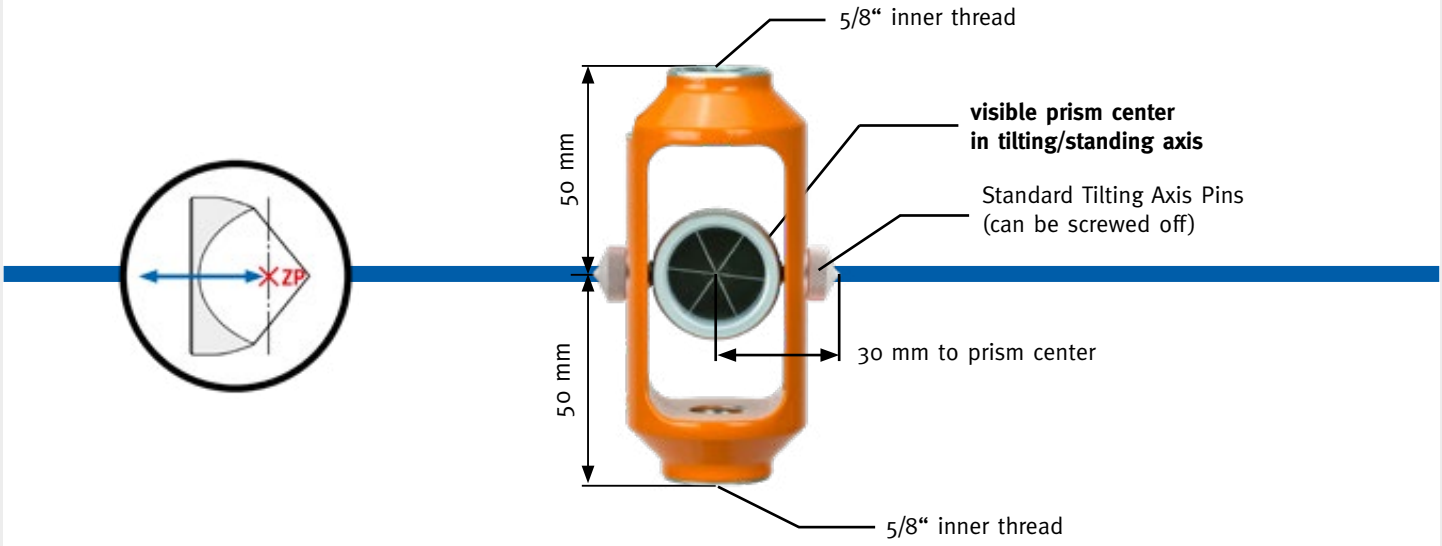
prices do not include any taxes

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
Prism HIP 2 x 5/8"	17,5 mm	**-11,3** (Leica = +23,1) mm	**1610.11**	221,-
	25 mm	**-16,9** (Leica = +17,5) mm	**1610.17**	221,-
	25 mm	**-30** (Leica = +4,4) mm	**1610.30**	247,-
	25 mm	**-34,4** (Leica = +0) mm	**1610.34**	252,-
	25 mm	**-35,0** (Leica = -0,6) mm	**1610.35**	252,-

Information on prism constants can be found at s. page 3

Description	prism constant K	Order-No.	Euro
Holder HIP, 2 x 5/8" with reflective foil	**0** (Leica = +34,4 mm)	**1615.0**	129,-

MORE OPTIONS

- **Protective cap**
  - • sees. page 27

- **Tilting axis pins**
  - • see s. page 21

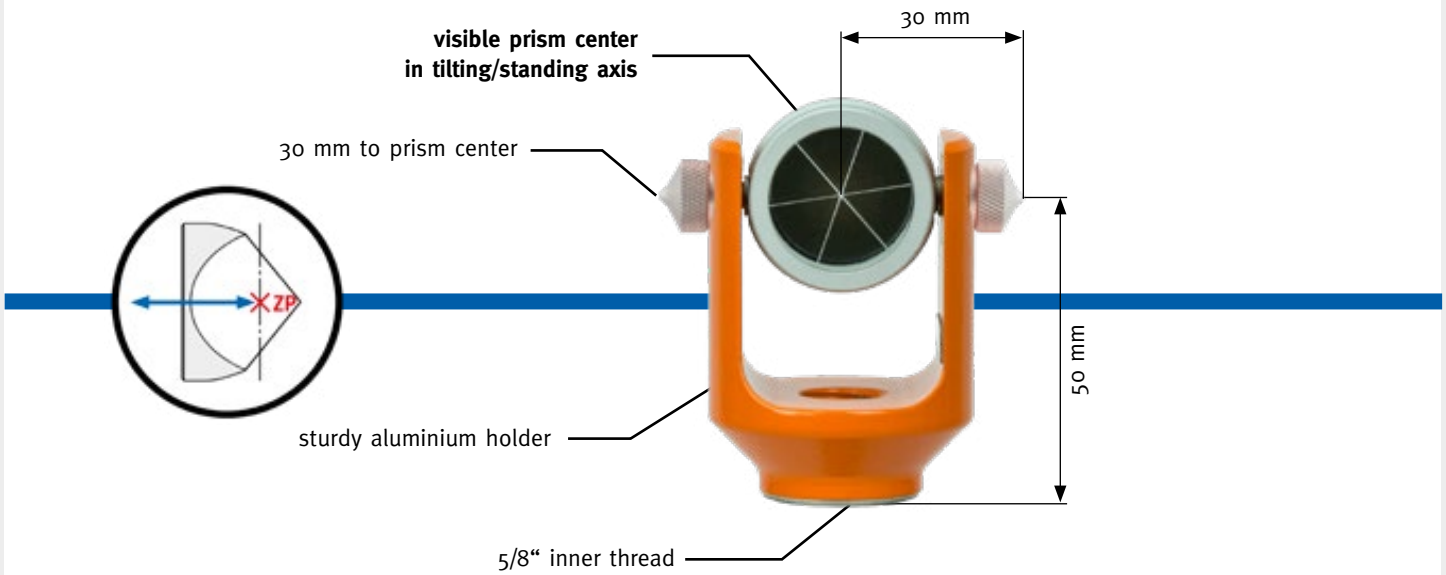
- **Red marked prism center**
  - • see s. page 21

- **Circular Level**
  - • see s. page 50

- **Offset spikes**
  - • see s. page 26

Prism HIP-U 5/8"

Prism holder with U-Design

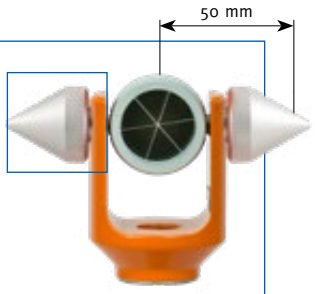


Description	Ø glass prism	prism constant K	Order-No.	Euro
Prism HIP-U 5/8"	17,5 mm	**-11,3** (Leica = +23,1) mm	**1620.11**	168,-
	25 mm	**-16,9** (Leica = +17,5) mm	**1620.17**	168,-
	25 mm	**-30** (Leica = +4,4) mm	**1620.30**	205,-
	25 mm	**-34,4** (Leica = +0) mm	**1620.34**	210,-
	25 mm	**-35,0** (Leica = -0,6) mm	**1620.35**	210,-

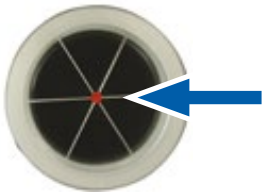
Information on prism constants: s. page 3

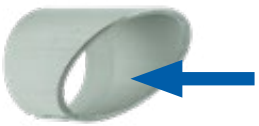
Description	prism constant K	Order-No.	Euro
Holder HIP-U 5/8" with reflective foil	**0** (Leica = +34,4 mm)	**1625.0**	89,-

MORE OPTIONS



- **Tilting axis pins**
  - s. page 21
- **Red marked prism center**
  - s. page 21
- **Offset spikes**
  - s. page 26
- **Protective cap**
  - s. page 27

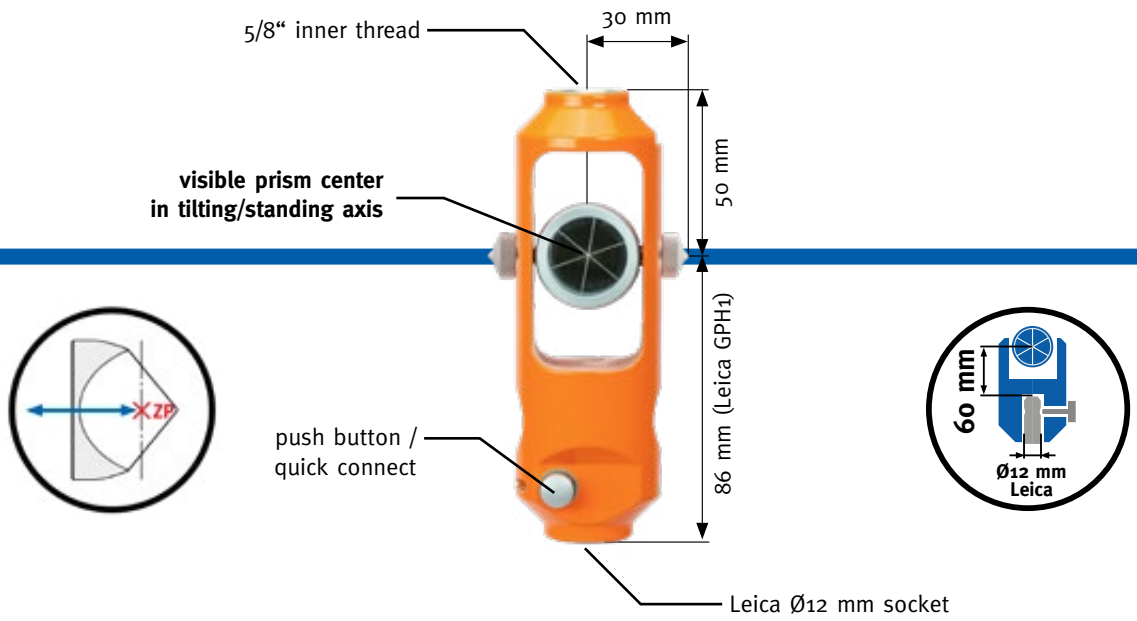




Prism HIP with Leica socket

Prism HIP Leica - 5/8"

- **Prism Holder with closed design**



Description	Ø glass prism	prism constant K	Order-No.	Euro
Prism HIP Leica-5/8"	17,5 mm	**-11,3** (Leica = +23,1) mm	**1630.11**	242,-
	25 mm	**-16,9** (Leica = +17,5) mm	**1630.17**	242,-
	25 mm	**-30** (Leica = +4,4) mm	**1630.30**	278,-
	25 mm	**-34,4** (Leica = +0) mm	**1630.34**	284,-
	25 mm	**-35,0** (Leica = -0,6) mm	**1630.35**	284,-

Information on prism constants: s. page 3

Description	prism constant K	Order-No.	Euro
Holder HIP Leica-5/8", with reflective foil	**0** (Leica = +34,4 mm)	**1635.0**	156,-

MORE OPTIONS

- **Protective cap**
  - s. page 27
- **Tilting axis pins**
  - s. page 21
- **Red marked prism center**
  - s. page 21
- **Circular Level**
  - s. page 50
- **Offset spikes**
  - s. page 26

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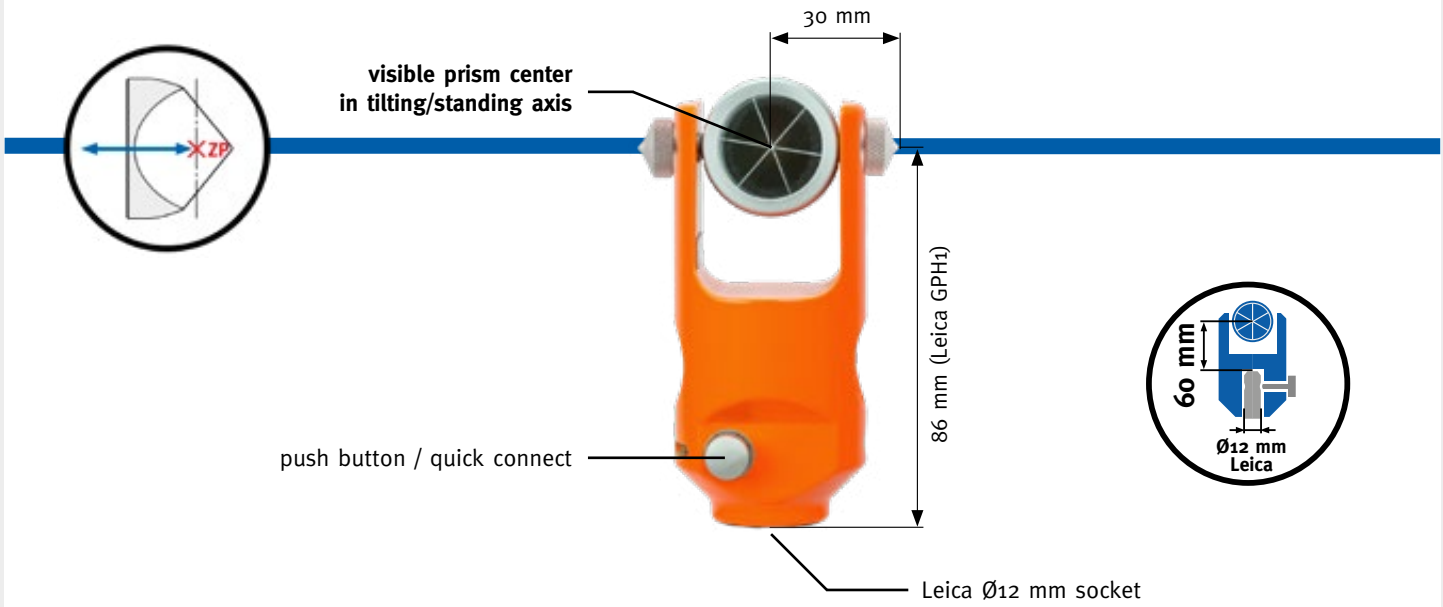
Prism HIP-U Leica

Prism holder with U-Design

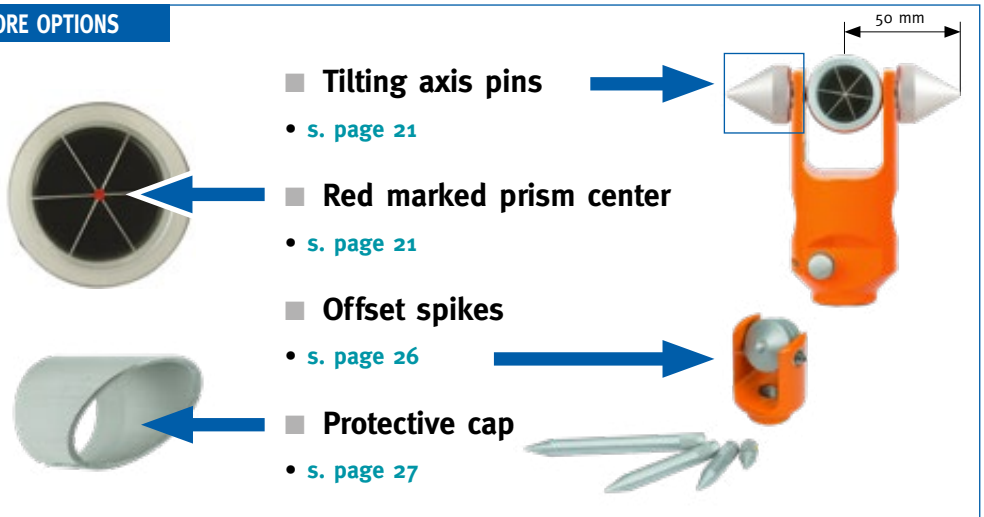


Description	Ø glass prism	prism constant K	Order-No.	Euro
Prism HIP-U Leica	17,5 mm	**-11,3** (Leica = +23,1) mm	**1640.11**	194,-
	25 mm	**-16,9** (Leica = +17,5) mm	**1640.17**	194,-
	25 mm	**-30** (Leica = +4,4) mm	**1640.30**	231,-
	25 mm	**-34,4** (Leica = +0) mm	**1640.34**	236,-
	25 mm	**-35,0** (Leica = -0,6) mm	**1640.35**	236,-

Information on prism constants: s. page 3

Description	prism constant K	Order-No.	Euro
HIP-U Leica with reflective foil	**0** (Leica = +34,4 mm)	**1645.0**	116,-

MORE OPTIONS



- **Tilting axis pins**
  - s. page 21
- **Red marked prism center**
  - s. page 21
- **Offset spikes**
  - s. page 26
- **Protective cap**
  - s. page 27

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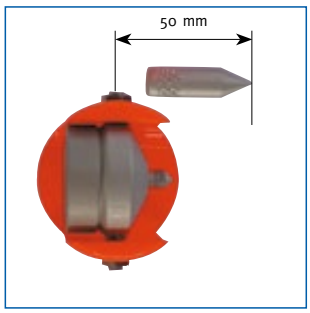
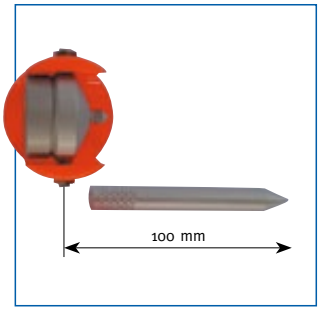
Offset spikes

For HIP prisms with glass prism

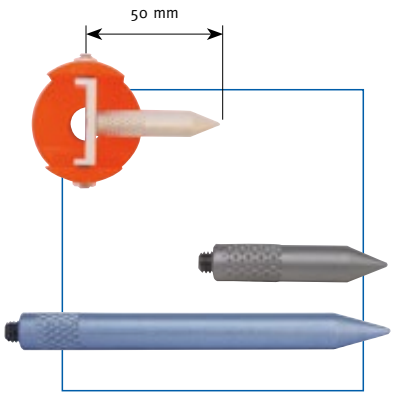
HD 50 and HD 100 for measuring vertical points, e.g. building facades, etc.
Can be screwed onto the rear thread of the prism housing.
Available for each system constant to achieve a round distance (= longitudinal eccentricity) to the mandrel tip (object point).



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



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



For holder HIP with reflective foil

The offset spike is screwed into the back of the tiltable target mark carrier.
When measuring a point with the offset spike, a **longitudinal eccentricity (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,-

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Protective Cap for HIP Prisms

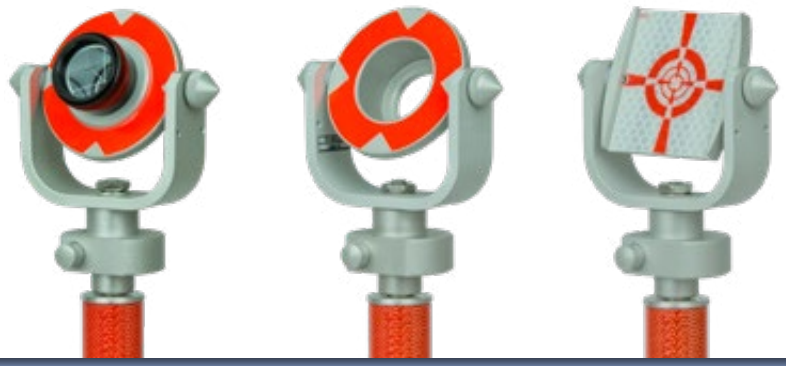
To protect the triple prism from weather conditions such as rain, snow, dust, etc. a protective cap can be mounted on all prisms of the HIP series.
Secure hold in wind and weather.

- 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,-

Prisms, Holders, Accessories

Holder series ONRT for MP24



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Prisms, Holder, Accessories

Holder ONRT for MP24

A.2.5 Use MP 24 on the ranging pole page 34

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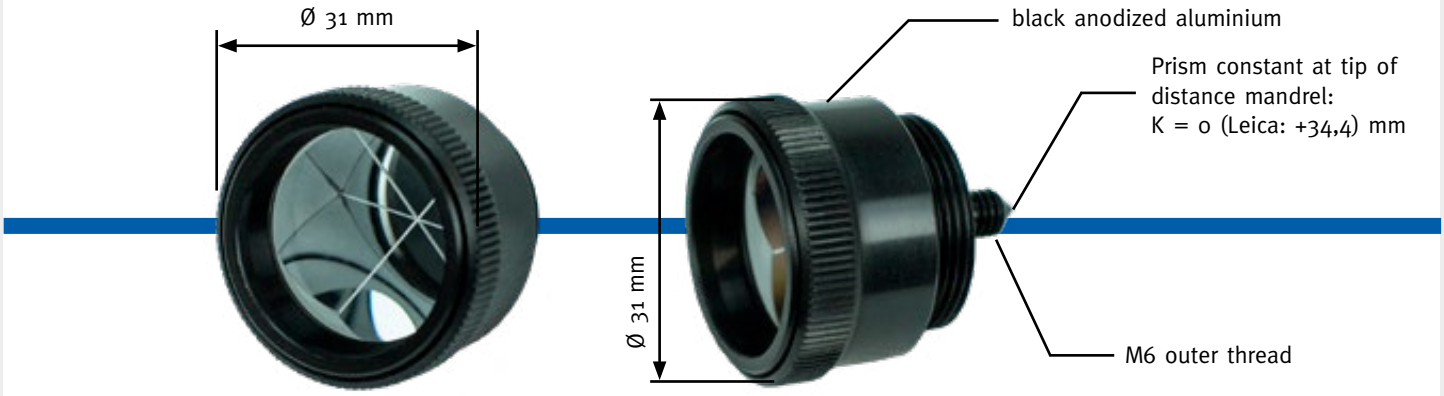
Mini Prism MP 24

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

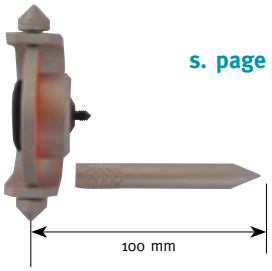
- Distance measurement range: up to over 1000 m (depending on device and weather)
- shockproof & waterproof
- Weight: 30 g



Description	Order-No.	Euro
Mini Prism MP 24	**1400**	100,-

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

Offset spikes



s. page 33

MP24 in closed design holder

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

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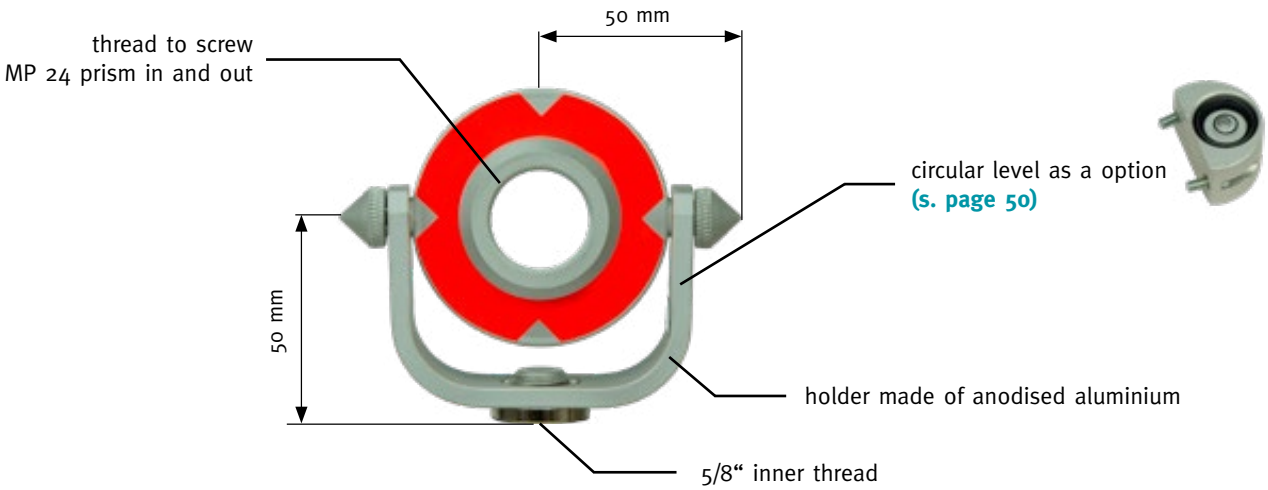
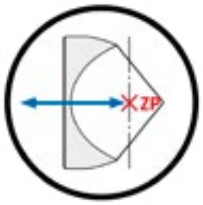
Prism Holder Type ONRT 50

U-shaped prism holder with 50 mm tilting axis height

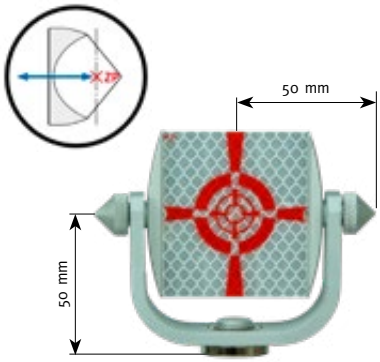


Description	prism constant K	Order-No.	Euro
Holder ONRT 50, for MP 24 prism **(without prism)**	**0** (Leica = +34,4 mm)	**0625.0**	83,-
	-11,3 (Leica = +23,1) mm	**0625.11**	83,-
	-16,9 (Leica = +17,5) mm	**0625.17**	83,-
	-30,0 (Leica = +4,4) mm	**0625.30**	83,-
	-34,4 (Leica = 0) mm	**0625.34**	83,-
	-35,0 (Leica = -0,6) mm	**0625.35**	83,-



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

s. page 30



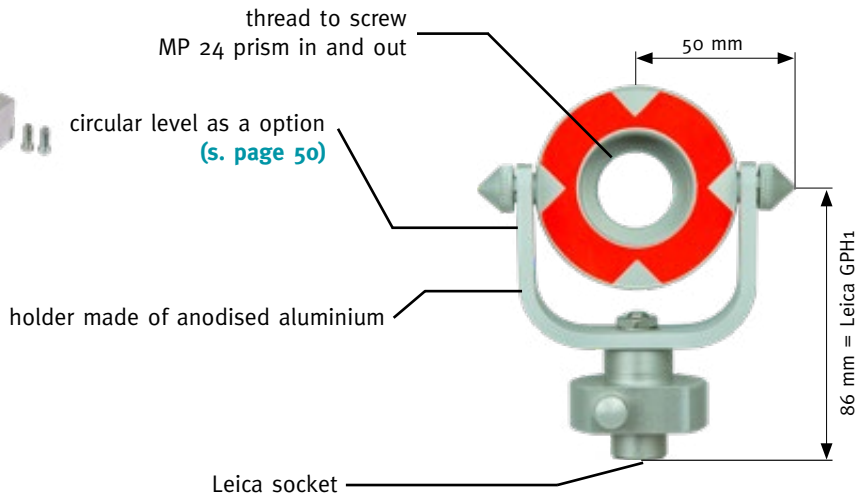
With reflective foil 52 x 60 mm

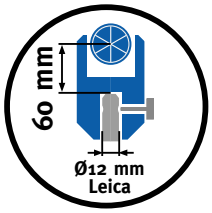
Integrated target plate with bright red target ring and target wedges optimized in standing and tilting axis. This minimizes targeting errors even when the prism is misaligned.

Description	prism constant K	Order-No.	Euro
Holder ONRT 50, with reflective foil	**0** (Leica = +34,4 mm)	**0628**	77,-

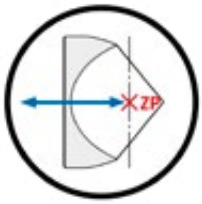
Prism Holder Type ONRT L

U-shaped prism holder



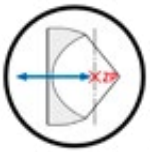


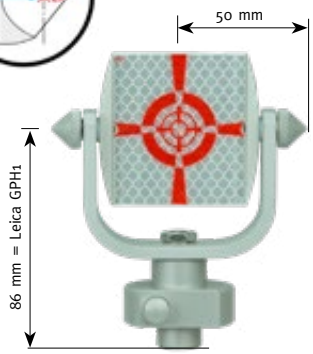
Description	prism constant K	Order-No.	Euro
Holder ONRT L, for prism MP 24 **(without prism)**	**0** (Leica = +34,4 mm)	**0655.0**	112,-
	-11,3 (Leica = +23,1) mm	**0655.11**	112,-
	-16,9 (Leica = +17,5) mm	**0655.17**	112,-
	-30,0 (Leica = +4,4) mm	**0655.30**	112,-
	-34,4 (Leica = 0) mm	**0655.34**	112,-
	-35,0 (Leica = -0,6) mm	**0655.35**	112,-



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

s. page 30





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**	103,-

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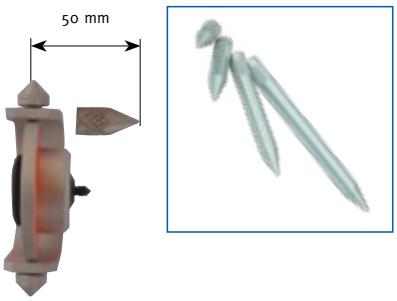
Accessories for series Type ONRT

Offset spikes for prism MP24

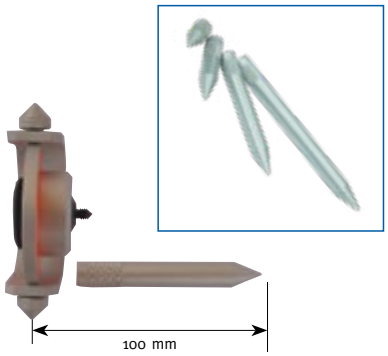
For measuring vertical points, e.g. building facades, etc.
The offset spike can be screwed onto the rear M6 distance mandrel of the MP24.
Available for each system constant to achieve a round distance (= longitudinal eccentricity) to the mandrel tip (object point).

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.

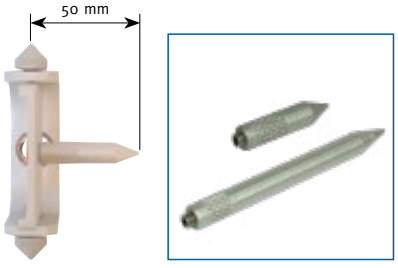


Longitudinal eccentricity/improvement: **+50 mm**			
Description	prism constant K	**Order-No.**	Euro
Offset spike MPV50/0	**0** (Leica = +34,4) mm	**1415.50**	8,-
Offset spike MPV50/11	**-11,3** (Leica = +23,1) mm	**1415.39**	8,-
Offset spike MPV50/16	**-16,9** (Leica = +17,5) mm	**1415.34**	8,-
Offset 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,-

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Mini Prism MP 24 on ranging poles

- Suitable for ranging poles of different diameters
- Easy assembly and disassembly on the ranging pole
- Fast repositioning over the entire length of the ranging pole
- For mini prisms with M6 outer thread (eg.: MP24, CST, OMNI, TOPCON)

!

All holders or clamps for ranging poles take the same offset addition to the vertical axis of the pole into account. This longitudinal eccentricity depends on the Prism constant distance set on the total station.
If standard ranging poles (Ø 26-28 mm) are used, the following improvement must be applied to the measured horizontal distance.

Prism constant K set in total station	longitudinal eccentricity (improvment)
0 (Leica = +34,4) mm	+15 mm
-11 (Leica = +23,1) mm	+26 mm
-16,9 (Leica = +17,5) mm	+32 mm
-30 (Leica = +4,4) mm	+45 mm
-34/35 (Leica = 0) mm	+50 mm

Ranging pole clamp with level for Mini Prism MP 24

The combination of a mini/small prism with a pole level, which is attached to the ranging pole with a high-quality elastic band, results in a full-value and robust prism pole.

- M6 inner thread to screw in MP24 prism
- Adjustable circular level

Description	Order-No.	Euro
Ranging pole clamp with level FRG 6 with elastic band (without prism)	**0930**	34,-

Ranging pole clamp for Mini Prism MP 24

Features and attachment to the pole as above for FRK, but without circular level.

Description	Order-No.	Euro
Ranging pole clamp FK 6 (without prism)	**0910**	15,-

INFO

By attaching the ranging pole clamp to the base of a ranging pole that is not exactly perpendicular, the error of the distance measurement can be minimized.

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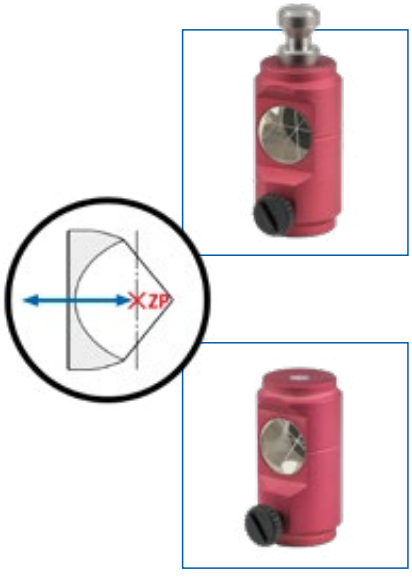
Cylinder Prism ZP11

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
s. page 108

Available in two designs:



With socket B1216 and bolt

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

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

With socket B1216 and M6 inner thread

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

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

Accessories for ZP11 prisms

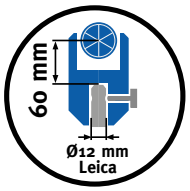
Cylinder prism ZP11 on prism pole

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

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

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

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



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

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

Cylinder Prism ZP11 on instrument tribrachs

Adapter tribrach inserts with 5/8“ outer thread

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

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

Adapter for tribrach inserts with Leica bolt

- s. top of page, Order-No. 0697

More Accessories

Circular level for Cylinder Prism ZP11 s. page 109

Stakeout spikes for Cylinder Prism ZP11 s. page 109

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)

Application Possibilities

As a Monitoring Prism on a L-Carrier

s. page 92

As a Twin-Prism

s. Seite 96page 96

As a modular mini vector

s. page 108

As monitoring point vertically above a point

s. Seite 99page 99

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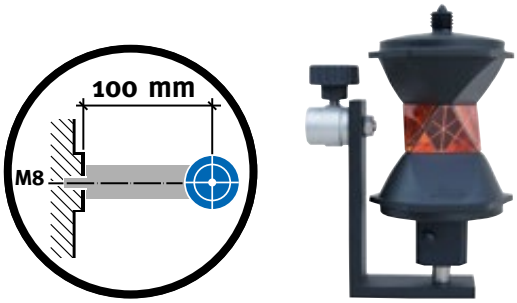
Prism, Holder, Accessories

360° Prisms



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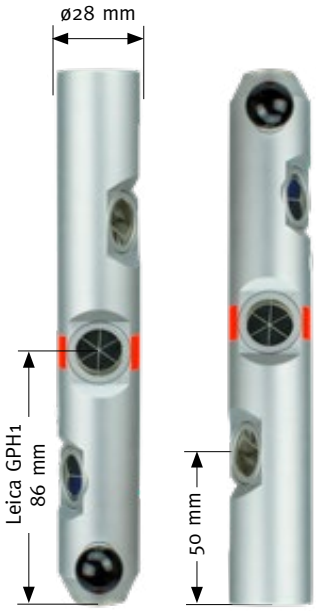
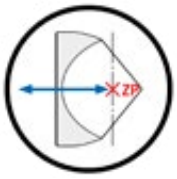


RUNDUM-Prism 6x60°

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

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

Mit Leica-Stehbolzenaufnahme ø 12 mm (für Stehbolzenlänge 27 und 40 mm) und 5/8"-Innengewinde, Gesamtlänge 179 mm, Gewicht: 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**	47,-

Other circular levels s. page 50

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

Other stakeout tips s. page 55

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: 90 g
- 6 triple prism, copper-coated on the back side

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

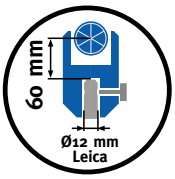
Adapter

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

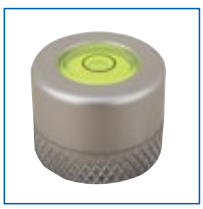
Description	Order-No.	Euro
Leica quick change adapter for 360°-Prism Bo Medium format	**5673.LS**	79,-

Central circular level with 1/4“ outer thread

Sensitivity 30'

- 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,-



Sensitivity 50'

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

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

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

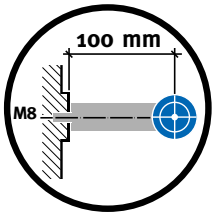
L-Holder for 360° Prism Bo Medium Format

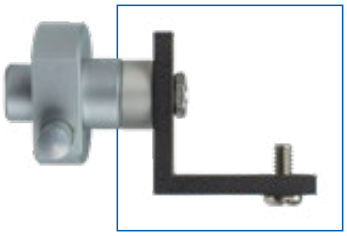
With M8 screw [Fig. 1]

- 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]

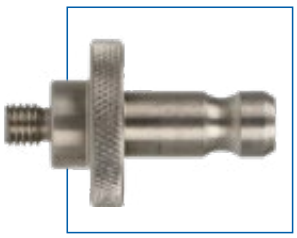




- L-Holder made of aluminium with Leica socket Ø 12 mm
- Push button for quick change and securing on the bolt
- 1/4“ outer thread for screwing on the 360° prism
- **Distance to wall bolt = 100 mm** (when using the wall adapter WA Leica)
- Target height = 86 mm

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

Wall adapter WA Leica (stainless steel) s. page 52



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

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

INFO Wall bolt s. page 100

Magnetic Quick Change Connection

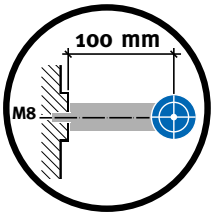
L-Holder with magentic base Ø 33 / Ø 40 mm

- L-Holder made of aluminium
- For centering plates with Ø 33 / Ø 40 mm
- For quick application / removal of the prism in seconds
- Very high centering accuracy ± 0,01 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**	83,-
L-Holder with magnetic base Ø 40 mm, target height 50 mm	**5671.M40**	83,-

Alternative: L-Holder with magn. base - Wall distance 100 mm



INFO M8-centering plates Ø 33 and Ø 40 mm and quick change adapters
s. page 238

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prices do not include any taxes

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

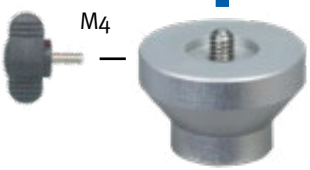
The protective cover can only be used in combination with the screw-on **circular level 5672 or with the adapter 5676**. These were not delivered with the M4 thread for the locking screw until July 2020.
If you own one of the parts that were purchased before July 2020, we can retrofit the thread. Please contact us for this.

5669

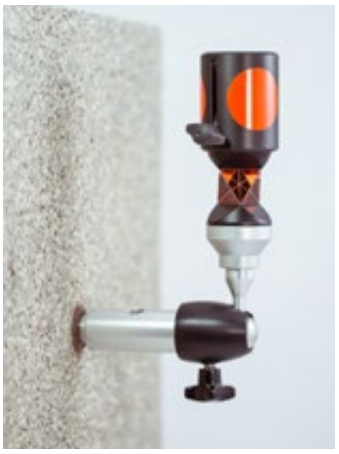
5672
s. page 40

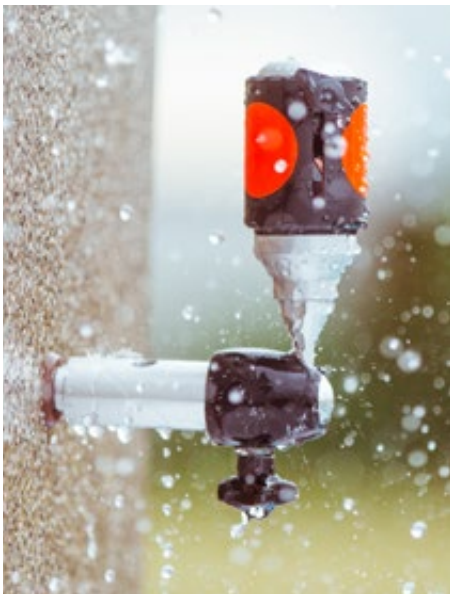
1/4“

5670
s. page 40



5676
s. page 40





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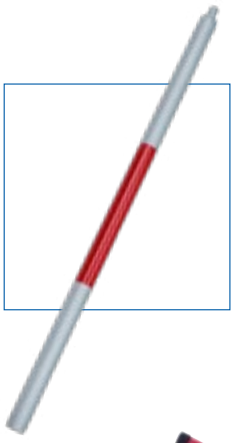
Stainless Steel Tip

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

Description	Order-No.	Euro
Tip for 360° Prism Bo Medium Format	**5670.S**	13,-



Extension 300 mm

- Ø 12 x 300 mm, aluminium
- Top: 1/4" inner thread, Bottom: 1/4" outer thread to screw in prism or extensions

Description	Order-No.	Euro
Extension Ø 12 x 300 mm for 360°-Prism Bo Medium Format	**5670.V**	11,-

Set: 4 Extensions + Tip

- 4 x Extensions Ø 12 x 300 mm, Aluminium
- Each extension with 1/4" inner thread and 1/4" outer thread
- 1 x tip Ø 12 x 50 mm, stainless steel with 1/4" outer thread
- Incl. transport case with 4 separate compartments

Description	Order-No.	Euro
Set: 4 extensions + tip for 360° Prism Bo Medium Format	**5670.V4S**	11,-

Circular Level

To clamp to tip or extension

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

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

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

Accessories for Leica 360°-Mini Prism GRZ101

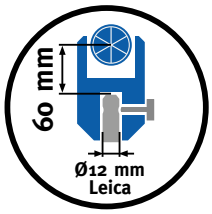
For universal use of the 360° prism with standard and special accessories

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

- Bottom: Socket connection for all Leica spigots Ø 12 mm
- 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,-

knurled

Circular Level

Sensitivity 50'

- 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.

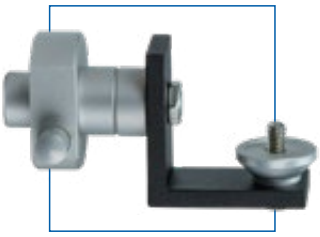
L-Holder for GRZ101

With M8 screw

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

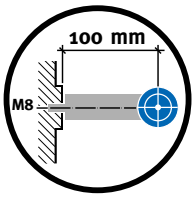
Description	Order-No.	Euro
L-holder w. M8 screw, 1/4" thread, target height 40 mm	**5687.M8**	62,-

INFO Wall bolts s. page 100

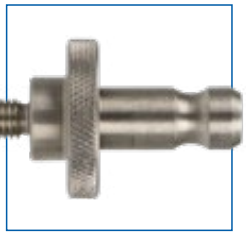


Mit Leica Druckknopf-Anschluss

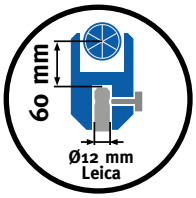
- Aluminium L-holder with Leica socket connection Ø 12 mm
- Push button for quick change and securing on Leica spigot
- 1/4“ outer thread to screw on 360° prism
- Target height = 86 mm
- **Distance from wall bolt = 100 mm** (when using the WA Leica adapter)



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



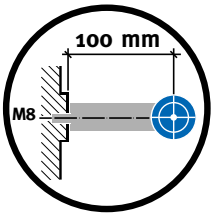
Wall adapter WA Leica s. page 52



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

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

Alternative: L-Holder with magn. base - Wall distance 100 mm



INFO M8-centering plates Ø 33 and Ø 40 mm and quick change adapters s. page 238

Stainless steel spike/tip for Leica GRZ101

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

Adapter 1/4“ - M8

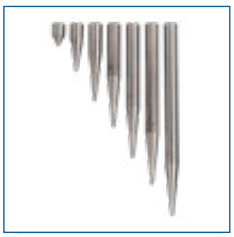
Serves as an adapter between the 1/4“ inner thread of the GRZ101 prism and the stainless steel tips (M8 inner thread)

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

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

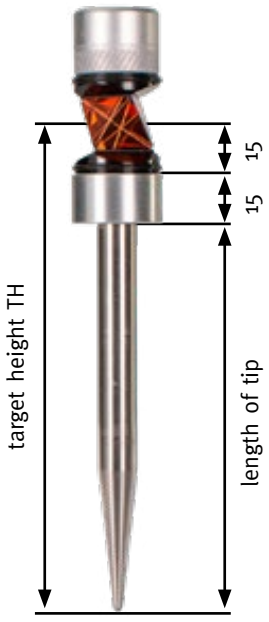
M8 Stainless steel spike/tip

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



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

Setup



Accessories

Screw-on Circular level

s. page 45

Circular level for poles with Ø12 mm

Usable from length 70 mm

s. page 44

Joint arm

s. page 58

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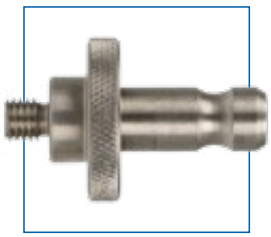
Accessories: Leica 360°- Prisma GRZ 4, 121, 122

L-Holder

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

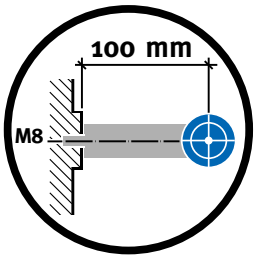
Description	Order-No.	Euro
L-holder, Leica socket with securing screw, Leica spigot Ø 12 x 40 mm	**5690**	152,-

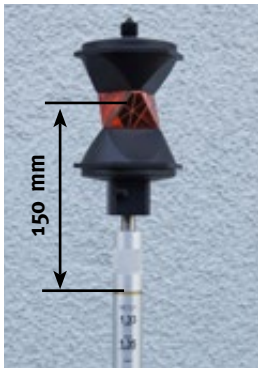


Wall Adapter WA Leica (stainless steel) s. page 52

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

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





INFO To reach the target height of 150 mm we offer a suitable adapter for the prism pole. Adapter **0378.90** you will find on s. page 271

Prisms, Holder, Accessories

Accessories

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**	33,-

Adjustable

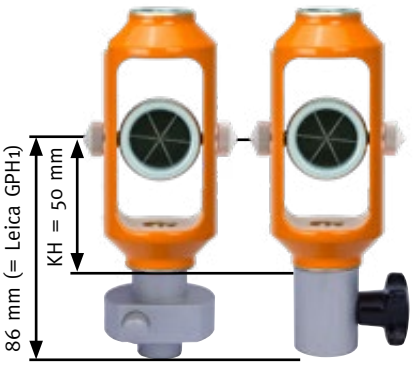
- Circular level can be adjusted with Allen key (2.5 mm)
- Dimensions: Ø 30 mm, Heihgt (without thread): 43 mm
- Supplied with Allen key

Description	Order-No.	Euro
Circular level, adjustable, sensitivity 30'	**1587.30**	47,-
Circular level, adjustable, sensitivity 10'	**1587.10**	50,-

Circular level for Prism Type ONRT

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

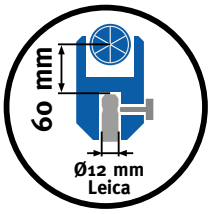
Description	Order-No.	Euro
Circular level JDL 14	**1850**	36,-



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 s. page 52.



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**

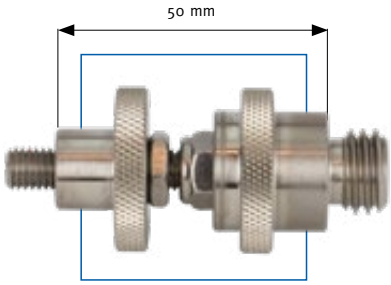
Description	Lenght Leica spigot Ø 12 mm	effective total length	Order-No.	Euro
Adapter 5/8"-Leica	27 mm	47 mm	**0377.27**	30,-
	40 mm	60 mm	**0377.40**	33,-

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"

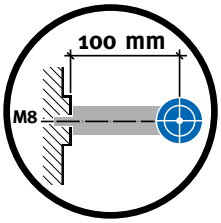
- Side 1: 5/8" outer thread to connect prism holders
- Side 2: M8 outer thread to screw in common wall bolts
- One common axis -› independently rotatable around this axis
- Rotation resistance can be adjusted with self-locking hexagon nut (SW 13)
- Large knurls for safe insertion without tools
- Screwing-in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

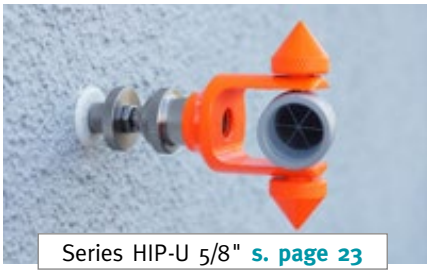


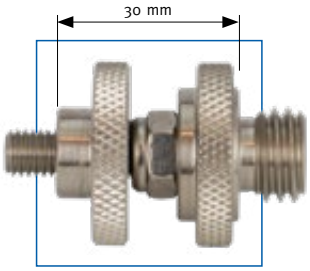
Length 50 mm

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).




Series HIP-U 5/8" s. page 23

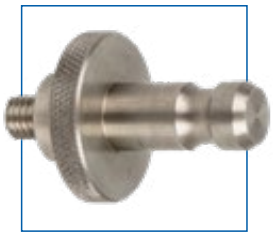


Length 30 mm

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

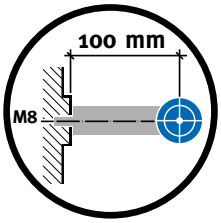
Adapter M8 – Leica Ø 12 mm

For tiltable reflector holders with Leica spigot Ø 12 mm.



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

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




Series HIP-U Leica s. page 25


L-holder Leica s. page 90

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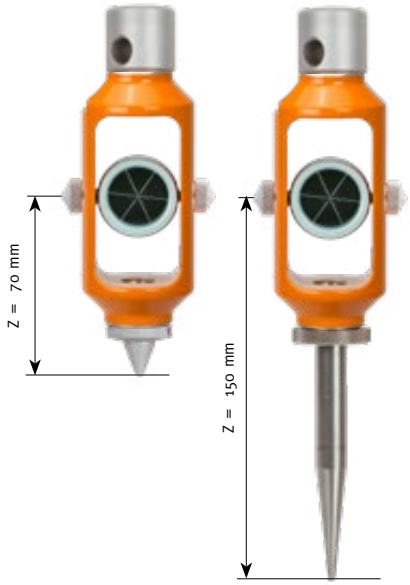


Stakeout spikes

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.

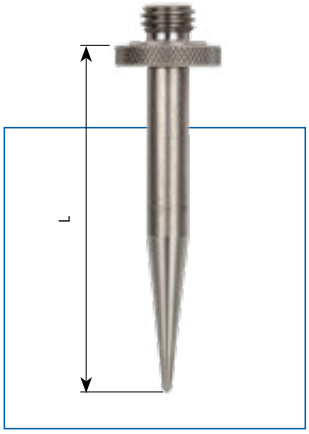
The long, slim tips in stainless steel design are excellently suited for precise piercing in soil.

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

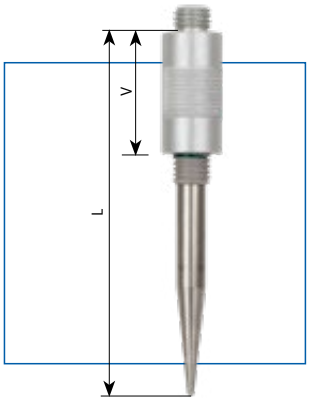
5/8“ outer thread and cylindrical tip Ø 12 mm made of stainless steel.
Also ideal for precise insertion into soil.

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.

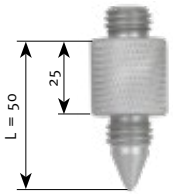
Description	Z	Order-No.	Euro
Stakeout spike 5/8“, steel, L = 50 mm	100 mm	**1859.100**	34,-
Stakeout spike 5/8“, steel, L = 100 mm	150 mm	**1859.150**	37,-
Stakeout spike 5/8“, steel, L = 150 mm	200 mm	**1859.200**	42,-

With additional 5/8" outer thread

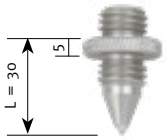
Additional 5/8“ external thread on the tip side for screwing the insertion tip into extensions or prism poles with 5/8“ internal thread (tip protected and always at hand). All extensions are made of aluminium. The lengths up to 50 mm have a conical tip with hardened steel insert. From 75 mm they have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



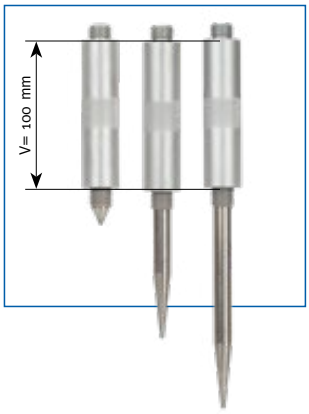
Description	Extension V	Z (KA = 50 mm)	Order-No.	Euro
Stakeout spike 5/8", L = 30 mm	5 mm	80 mm	**1853.2**	23,-
Stakeout spike 5/8", L = 40 mm	15 mm	90 mm	**1854.2**	25,-
Stakeout spike 5/8", L = 50 mm	25 mm	100 mm	**1855.2**	27,-
Stakeout spike 5/8", L = 75 mm	50 mm	125 mm	**1856.75**	32,-
Stakeout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



No. 1855.2

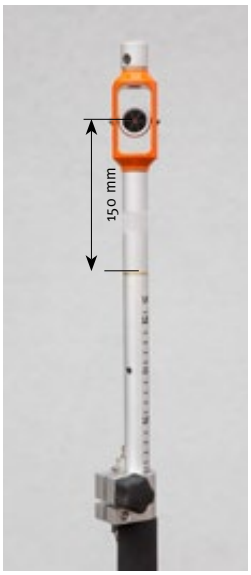


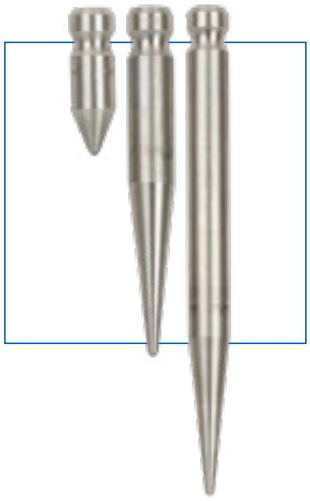
No. 1853.2



Matched to prism poles with 150 mm target height

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

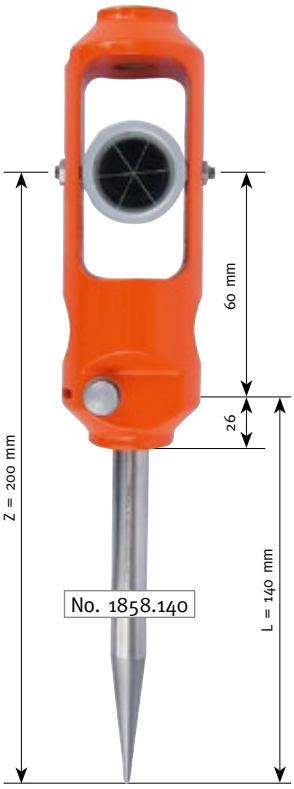


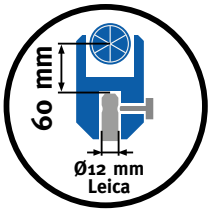


Stakeout spike Leica Ø 12 mm

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

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



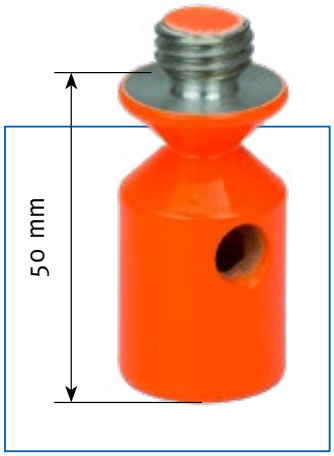


Handgrip

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

Description	Order-No.	Euro
Handgrip 5/8"	**0700**	32,-

INFO Any 5/8“ extensions can be screwed between the handgrip and the prism. Extensions page 282.

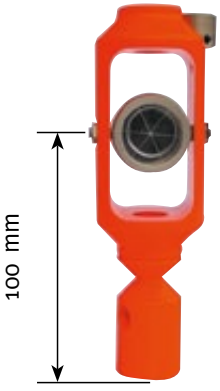


Extension 50 mm

Brings the 5/8“ connection of the prism holders of the HIP, HIP-U, L-holder, TOP, ONRT 50 and RUNDUM 6x60° prism series to the standard tilting axis height of 100 mm.

- Ø 27 mm signal colour (orange-red)
- Bulge for exact targeting
- Large horizontal bore as screw-on and screw-off support (with screwdriver or similar)

Description	Order-No.	Euro
Extension HV50	**0301.50**	26,-



Mini tripod with pole clamp

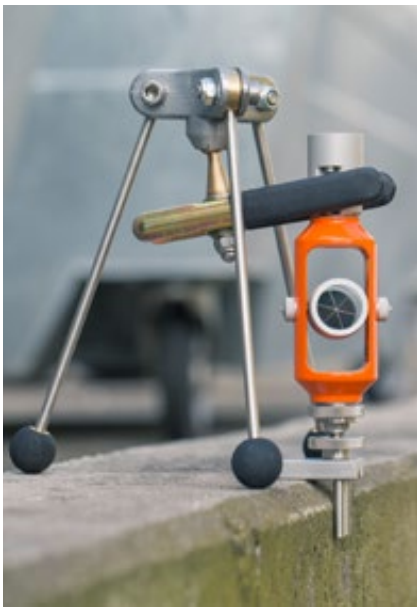
For simple and stable assembly of short prism poles

- High-quality materials and workmanship
- Tripod legs can be folded out individually and remain in the selected position, adjustable resistance
- Interchangeable balls as tripod feet for secure standing and low sinking on soft surfaces

- Ball head with freely adjustable position
- Pole clamp with straight legs for rods up to Ø 38 mm, clamping length 80 mm
- Height of pole clamp with tripod legs folded in: 28 cm
- Weight: 750 g (with stainless steel balls), 600 g (with rubber balls)

Description	Order-No.	Euro
Mini tripod with pole clamp and stainless steel balls	**6270**	94,-
Mini tripod with pole clamp and rubber balls	**6272**	94,-

The pole clamp can be aligned downwards for lower positions.



Articulated tripod with pole clamp

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

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

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

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

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

Tripod bases

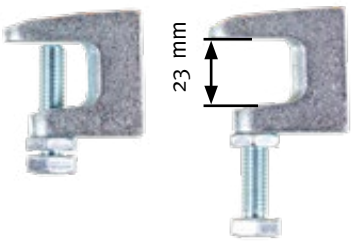
Depending on the application, the joint tripod can be screwed onto different bases using an M8 thread:

Description	Order-No.	Euro
Universal sturdy clamp for joint tripod (s. page 116)	**6884**	79,-
Claw clamp for joint tripod (s. page 116)	**5934**	63,-
Steel ring for joint tripod (s. page 114)	**5932**	37,-
Magnetic base for joint tripod (s. page 115)	**5930**	37,-
Suction holder, without vacuum indicator (s. page 117)	**5936**	48,-
Suction holder, with vacuum indicator (s. page 117)	**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.

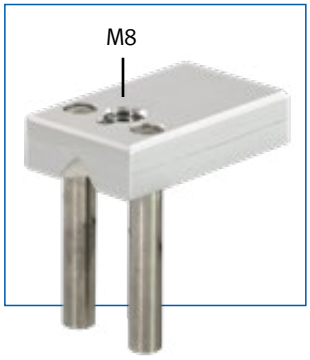
Description	Order-No.	Euro
Beam clamp M8, clamping range: 1 - 23 mm	**6886**	5,-

M8 Edge / Chamfer / Wall Adapter

For wall edges, also chamfered concrete parts

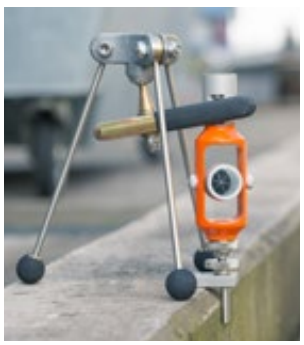
An adapter with a corresponding M8 external thread is screwed into the M8 thread. Then all prisms can be used that have a 5/8“ internal thread or a Leica mount as well as an **integrated circular bubble**.

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

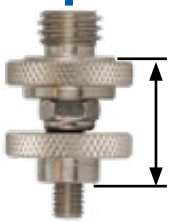


Description	Order-No.	Euro
M8 edge adapter for wall chamfers	**6810**	37,-

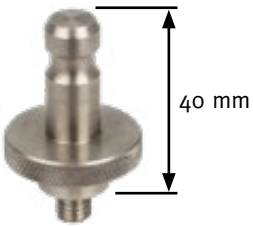
Examples

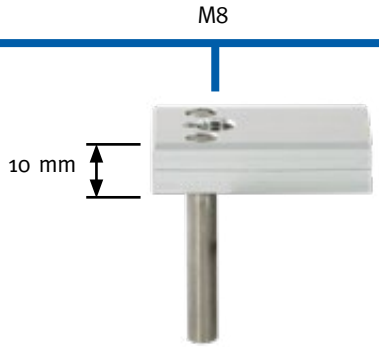


Adapter WA 30, M8
Art.-No. **0820** • 43,- €
s. page 52



Adapter WA Leica, M8
Art.-No. **0830** • 18,- €
s. page 52





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Monitoring / Tunneling

Page 1 of 2

Monitoring / Tunneling

Page 2 of 2

B.5 Twin-Prism-System (two prisms) page 94




B.6 Perpendicular over measuring point - 1 or more prisms page 97






B.7 M8 wall bolts as surveying points page 100






Our 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

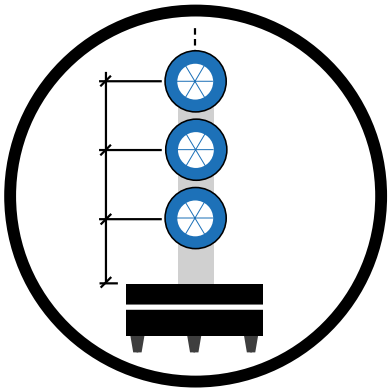
Advantages

- 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 s. page 35
- Very slim, space-saving, yet stable construction
- Prisms are individually rotatable by 360°
- Cylinder prisms can also be used for other versatile applications
- Tightening screws for fixing the selected direction
- Theoretically any number of prisms possible

L-Carrier with Ball Prisms

- Use of thread bases with ball prisms with constants -11.3 mm or -16,9 mm s. page 76
- Protective visor for ball prisms available (as rain/weather protection and to avoid influence on measurement of reflections from other prisms)
- Up to three prisms in a space-saving space
- Maximum coverage (depending on use and orientation): Approx. 300° horizontal and 180° vertical

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

Stacking of HIP prisms

- Use of all HIP prisms 2x5/8“ possible (5 different constants) s. page 22
- Connecting elements between the prisms allow individual 360° rotation s. page 281
- 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 s. page 27
- 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.

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Monitoring: Ball prism, Base, Centering plate

Monitoring

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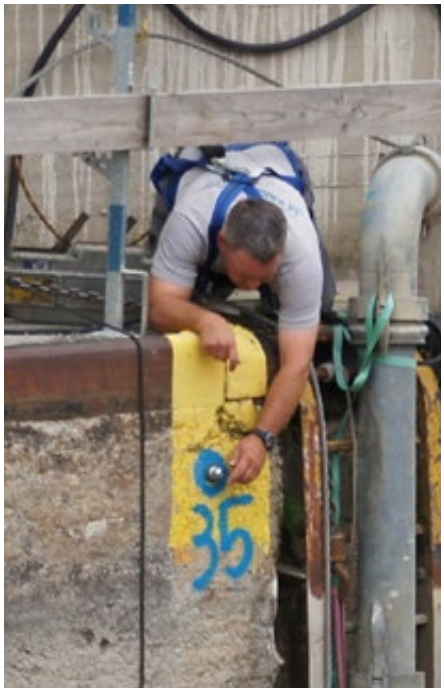
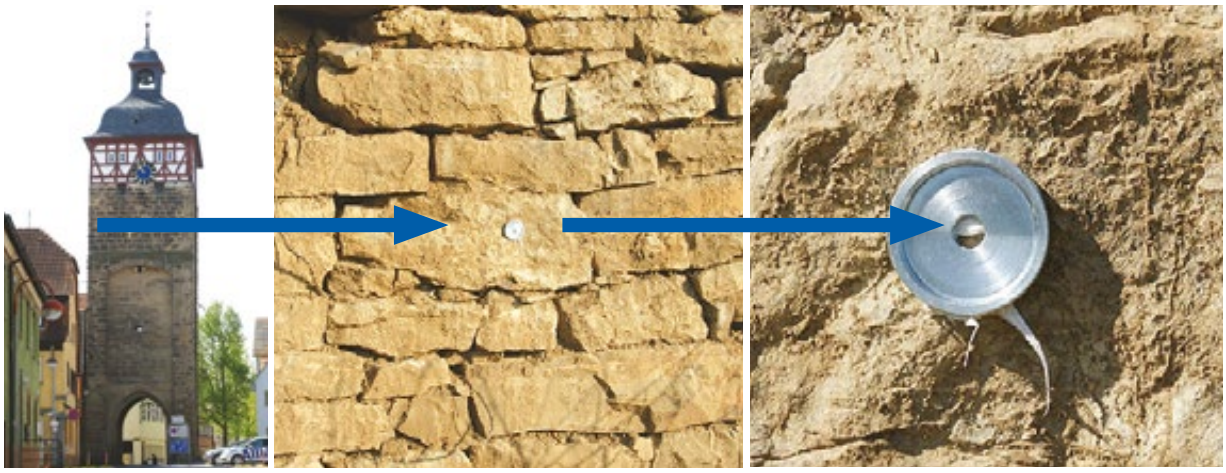
APPLICATION EXAMPLE FLOODGATE RENOVATION



APPLICATION EXAMPLE MONUMENT MONITORING



APPLICATION EXAMPLE TRACK/RAIL MONITORING

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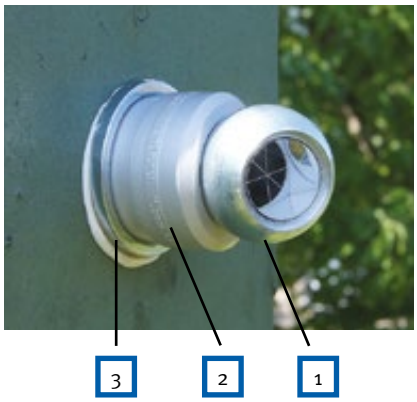
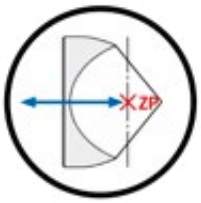


Monitoring: Ball Prism System

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, Ø1.5“ additionally with K = -16,9 mm.
The triple prism with its centrally symmetrical point (= visible prism centre) is ideally located in the centre of the steel ball. If the prism is inaccurately aligned with the tachymeter, only the smallest inaccuracies will occur.

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.

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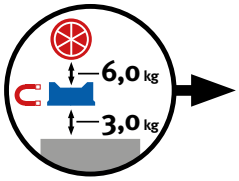
The choice is yours

Base / nest: strength of magnetic holding force

Example



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

The use of bases with weak magnets in practice however has shown that although the prism remains reliably attached to the ball base, in certain applications the set direction towards the tachymeter can change when left unsupervised.
For example during long-term monitoring on railroad-tracks. When a train drives by, the rail is subjected to strong vibrations. These vibrations are transmitted to the ball base. For this we recommend bases with strong magnetic forces, so the ball prism does not change its set alignment towards the total station.

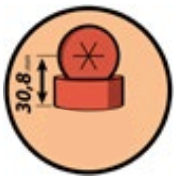
Base / nest: Base diameter

Example

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

Example



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.

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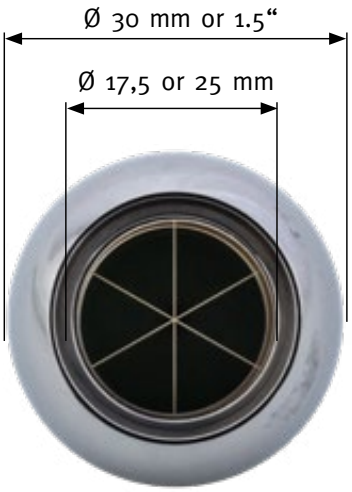


Ball prism: Diameters of the steel-sphere

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

Ball prism: Galvanized steel or stainless steel

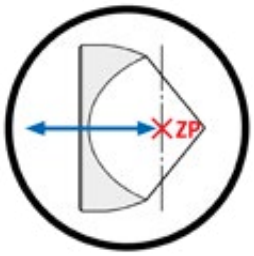
As our ball monitoring system finds more and more applications, the demands change as well. For this reason, in addition to the classic galvanized steel version, we also offer ball prism casings in stainless steel design. These have increased weather resistance and are also magnetic.

General: Accuracies

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

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

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



Ball prisms with test certificate

Highest accuracy - with tested prism constant

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

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

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

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

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

Purchase ball prism with test certificate
Would you like to buy tested ball prisms? Just send us an email:

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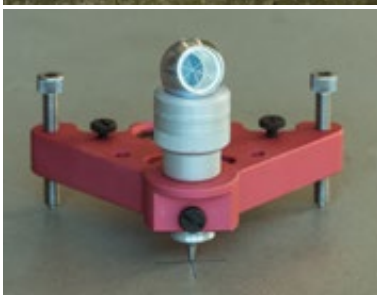
Additional application examples: Ball prism

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

With stake-out tip and level

Our thread bases with 5/8“ internal thread (s. page 76) can easily be supplemented with any positioning tip/spike (s. page 53). Use 1466.B as circular bubble.
If you want to use the pendulum head as a stake-out point, choose 0140 (s. page 139).



With ground tripod „Triangel“

s. page 118

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 (s. page 72). 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, s. page 127).

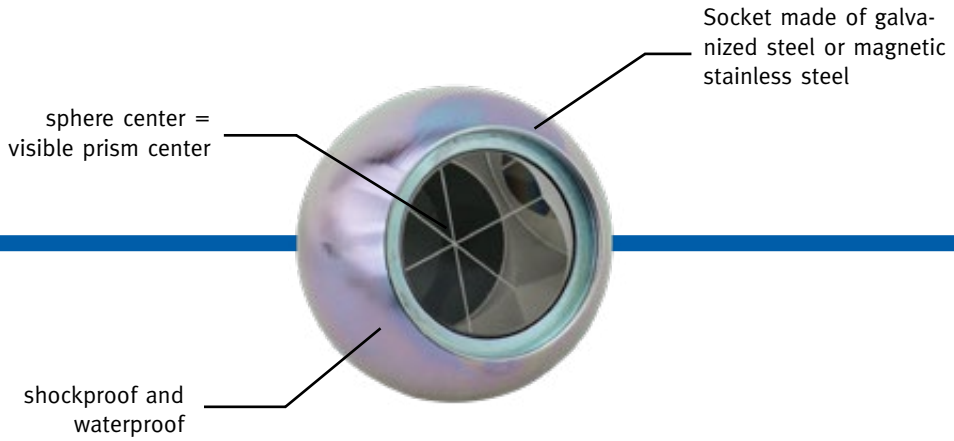
Two ball prisms in Twin-System

s. page 94

More possibilities

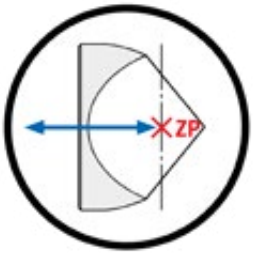
Ball Prism Ø 30 mm

- 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



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: s. page 85.

Ball target Ø 30 mm with reflective foil

- For measurements at shorter distances and without automatic target acquisition
- Reflective foil applied in the axis / level of the ball centre
- Prism constant of K = 0 (Leica= +34.4) mm
- Target mark is exactly in center of the ball for highly accurate angle measurement
- Outer Ø reflective foil: 20 mm
- With M6 inner thread at back
- Outer Ø Target for angle measurement: 5 mm
- Inner Ø target for angle measurement: 0.5 mm
- (other designs possible on request)
- Weight: 75 g

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

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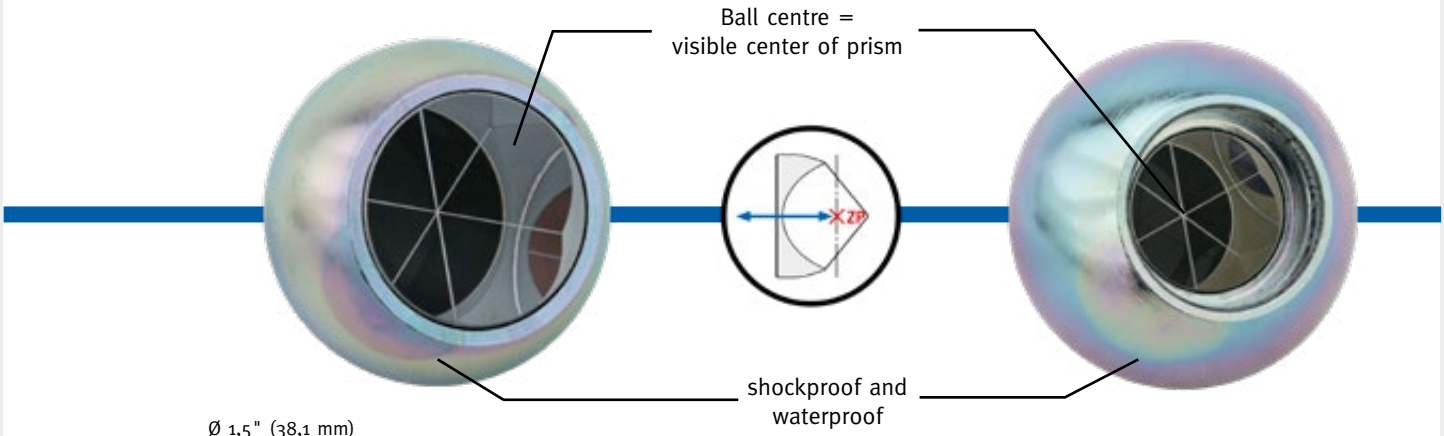
Ball prism Ø 1.5" (38,1 mm)

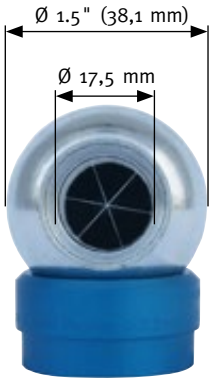
- Material of the ball: Galvanized steel or magnetic stainless steel
- Steel sphere-Ø 1.5“: ± 0,05 mm
- Grinding accuracy of triple prism: 2"
- Reflective surfaces: Silver mirrored on the rear side
- Mounting of the prism in sphere: ± 0,1 mm
- On request also available with test certificate



Prism constant: K= -16,9 (Leica = +17,5) mm

- With triple prism made of glass Ø 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“, **K = -11,3** (Leica = +23,1) mm	galvanized steel	**1453**	152,-
	stainless steel	**1453.S**	168,-

Protective cap

A protective cap can be clipped onto the 1453 and 1453.S ball prisms. Info: s. page 85.

Ball target Ø 1.5“ with reflective foil

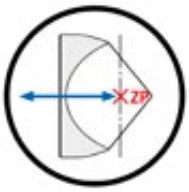
- For measurements at shorter distances and without automatic target acquisition
- Reflective foil applied in the axis / level of the ball center
- Prism constant of K = 0 (Leica= +34.4) mm
- Stainless steel casing

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

Magnetic Ball Prism Monitoring System

Thread base for Ø30 mm

With magnet and various thread sizes s. page 76



Thread base for Ø1.5“

With magnet and various thread sizes s. page 76

Ø30 mm Ball Prism

With prism / reflective foil s. page 71

Ø1.5“ Ball Prism

With two prism constants or reflective foil s. page 72

Base for ball prism Ø30 mm

Magnetic holding force in three different strengths s. page 74

Base for ball prism Ø1.5“

Magnetic holding force in two different strengths s. page 75

Base for ball prism Ø1.5“

Magnetic holding force in two different strengths s. page 75

Centering plate Ø33 mm

For adhesive bonding or screwing on s. page 81

Centering plate Ø40 mm

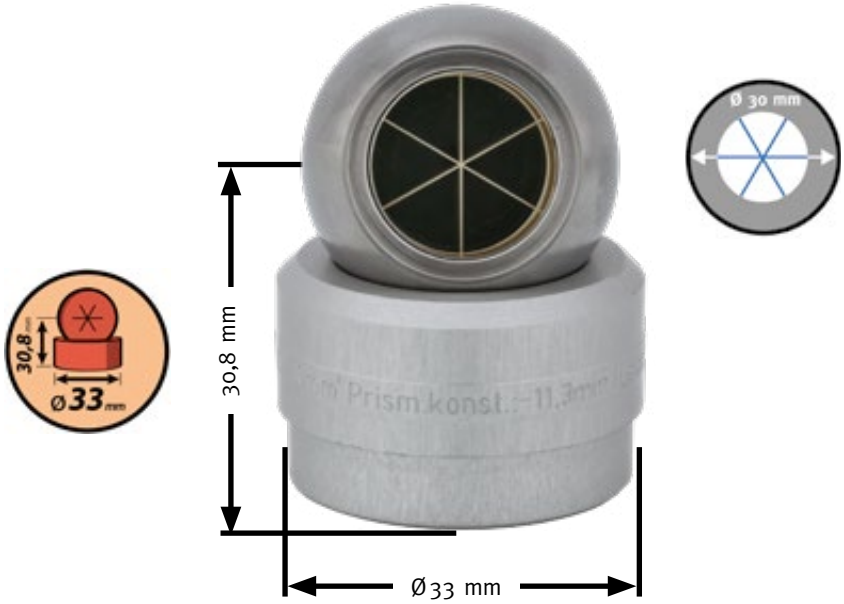
For adhesive bonding or screwing on s. page 83

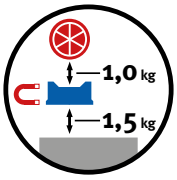
Base with integrated magnet for ball-Ø 30 mm

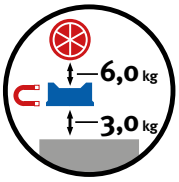
- Turned part made of hard anodised aluminium with integrated permanent magnet
- For mounting on magnetic surfaces, e.g. railway rails, machines, vehicles and centring plates
- Each base is supplied with a protective cover plate

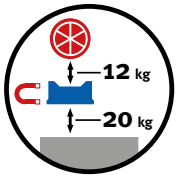
Protective cover plate

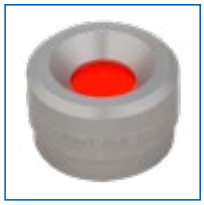
The base can be fitted with a cover plate during the period no measurements are taking place. It is also held magnetically and protects the ball base / nest from dirt and weather influences.











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

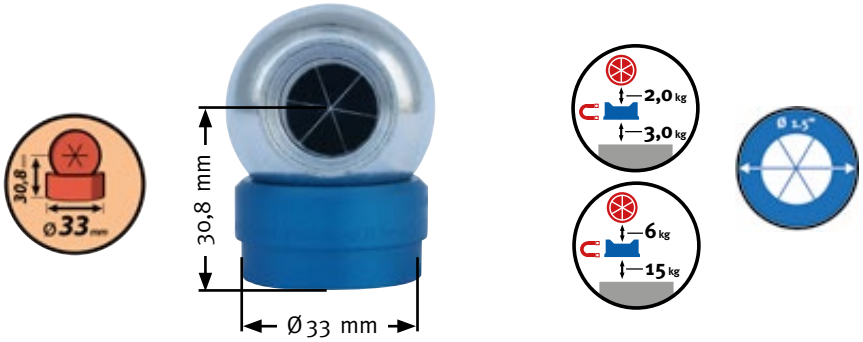
INFO Due to the very high holding force of the strong magnets of the bases 1460.S and 1460.S2, the use of a „remover"-tool is recommended. Further information can be found on s. page 77.

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

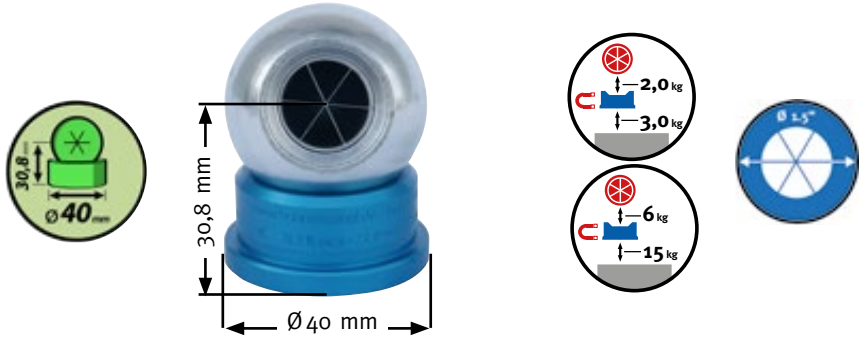
- Turned part made of hard anodised aluminium with integrated permanent magnet
- For mounting on magnetic surfaces, e.g. railway rails, machines, vehicles and centring plates
- Each base is supplied with a protective cover plate

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.

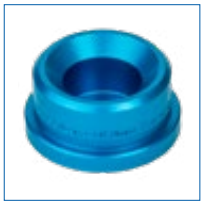


Description	magnet. force	Order-No.	Euro
Base Ø 33 mm for ball prism Ø 1.5“, with integrated magnet and protective plate	**approx. 2,0/3,0 kg**	**1457.S**	34,-
	approx. 6,0/15,0 kg	**1457.S2**	36,-



Description	magnet. force	Order-No.	Euro
Base Ø 40 mm for ball prism Ø 1.5“, with integrated magnet and protective plate	**approx. 2,0/3,0 kg**	**1458.S**	34,-
	approx. 6,0/15,0 kg	**1458.S2**	36,-

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 s. page 77.



Base without permanent magnet

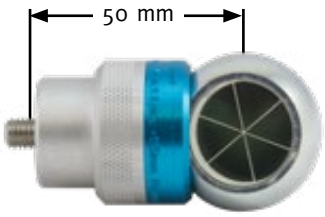
Can be used only in horizontally mounted centering plates Ø40 mm.

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

Example: Mounted to a wall bolt

Magnetic base with 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 (s. page 74)
- On request many of the bases are also available with weaker or stronger magnets

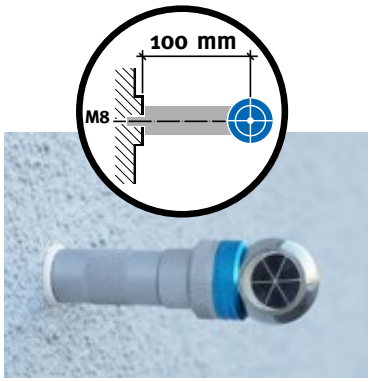


For ball prism Ø 1.5" (38,1 mm)

With **inner thread**				
Description	thread connection	magn. holding force	**Order-No.**	Euro
Base for ball prism Ø 1.5", inner thread	1/4"	approx. 3 kg	**1466.14**	49,-
	M8	approx. 3 kg	**1466.08**	49,-
	5/8"	approx. 3 kg	**1466.58**	49,-
With **outer thread**				
Description	thread connection	magn. holding force	**Order-No.**	Euro
Base for ball prism Ø 1.5", outer thread	1/4" x 8 mm	approx. 3 kg	**1466.14a**	52,-
	M8 x 8 mm	approx. 1 kg	**1466.08aL**	42,-
		approx. 3 kg	**1466.08a**	52,-
	5/8" x 11 mm	approx. 3 kg	**1466.58a**	52,-

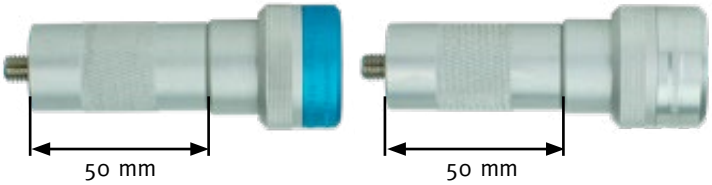
For ball prism Ø 30 mm

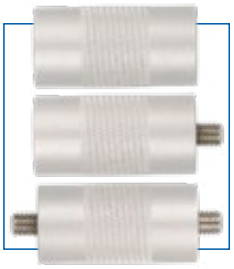
With **inner thread**				
Description	thread connection	magn. holding force	**Order-No.**	Euro
Base for ball prism Ø 30 mm, oinner thread	1/4"	approx. 4,5 kg	**1465.214**	49,-
	M8	approx. 4,5 kg	**1465.208**	49,-
	5/8"	approx. 4,5 kg	**1465.258**	49,-
With **outer thread**				
Description	thread connection	magn. holding force	**Order-No.**	Euro
Base for ball prism Ø 30 mm, outer thread	1/4" x 8 mm	approx. 4,5 kg	**1465.214a**	52,-
	M8 x 8 mm	approx. 0,5 kg	**1465.08a**	42,-
		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 (s. page 76) 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, Aluminium, Ø 25 x 50 mm	M8 inner thread	M8 inner thread	**0372.050**	24,-
	M8 outer thread	M8 inner thread	**0373.050**	25,-
	M8 outer thread	M8 outer thread	**0374.050**	26,-

NOTE

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

Remover Tool

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

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

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

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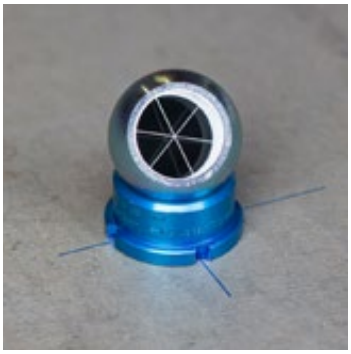


Centering Base ‚Compact'

Possibility of staking out and measuring object points

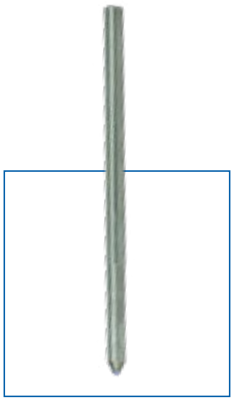
Additional features extend the application possibilities of the classic magnet base 1458.S (s. page 75) by further practical functions:

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.

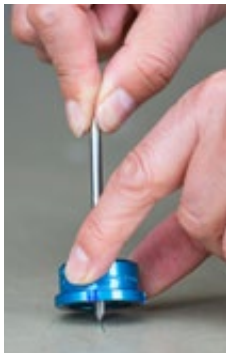
- Stakeout of points. After correct positioning, the ball is removed. Use the pin to mark the point to be staked out with a light hammer blow, if necessary.
- Measuring of points. Using the centering pin, the base can be placed at a point that is already marked on the object (e.g. cross, grain).

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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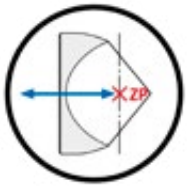
prices do not include any taxes

Nutshell Adapter: Ø30 mm to Ø1.5“



Ball prisms are available with outer Ø 30 mm and Ø1.5“.
With the nutshell adapter, the small Ø30 mm balls can now also be inserted into the „large“ bases for Ø1.5“ balls:

- **Standard bases for 1.5“ balls** with base-Ø 33 and 40 mm s. page 75
- Bases / nests with various **bases with threads** s. page 76
- **Magnetic quick change system** for force-centered switching between ball prisms and laser scanning/lasertracker targets, e.g. for registration and georeferencing s. page 238

With Ø1.5“, ball reflectors from other areas of surveying are also offered, including SMR angle mirrors for laser trackers used in industrial surveying.
To ensure compatibility between the various surveying disciplines, we have developed bases/nests which have since only been used in combination with Ø1.5“ spheres.
Now these applications are also possible with the 30 mm balls:

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

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

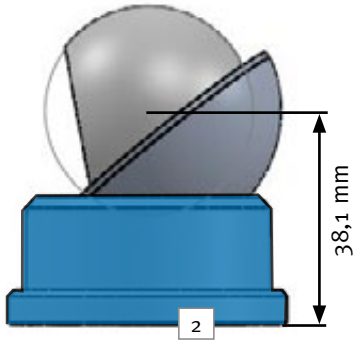
Description	Order-No.	Euro
Nutshell adapter: Ø30 mm to Ø1.5“	**1437**	39,-

Properties of the nut shell adapter:

- Made of non-magnetic stainless steel
- Since the magnetic holding force of the base is weakened due to the greater distance to the magnetic ball, we recommend using bases with higher holding force
- A central bore Ø5 mm makes the use of the centering pin No. 1458.ZS possible (s. page 78)
- Even if the adapter is placed on the base at a slight angle, there will be no inaccuracies. The ball centre maintains the same 3D position x, y, z

Insertable balls Ø30 mm
1450 s. page 71
1450.S s. page 71
1451.SP s. page 71

Now usable Ø1.5“ bases
Standard Ø1.5“ bases s. page 75
3D stainless steel bases s. page 121
Klimax-Bases s. page 129
Bases with threads s. page 76



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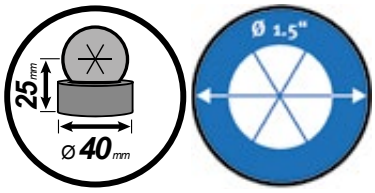
Stainless steel base for ball-Ø 1.5" (38,1 mm)

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



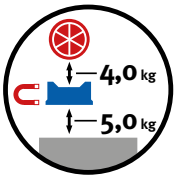
With permanent magnet

The integrated permanent magnet allows the ball base to be attached to all magnetic surfaces, e.g. railway rails, machines, vehicles and centering plates. s. page 83.

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 ± 0,1 mm
- Bottom surface-diameter of base: Ø40 ± 0,01 mm
- Fits to centering plate No. 6009 s. page 83
- Ring marking with engraved ball Ø and height offset HO 25 mm
- Each base is shipped with a cover plate

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



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

[1]

[2]

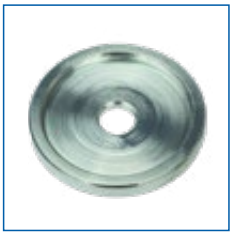
Centering pin / center punch for base 1430 and 1431

For staking out, registering and controlling points.

For detailed information on the features and the application of the centering pin and bearing insert, see s. page 131.

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

PLEASE NOTE Please also note our special bases made of stainless steel for industrial 3-D measurements s. page 121



Centering plate for Ø 33 mm

To use with adhesive

- Galvanized steel plate Ø 40 x 4 mm, magnetic
- To use with **assembly adhesive** (s. page 84)
- Accuracy of centering fit Ø 33 mm: ± 0,1 mm
- Bore hole Ø 8 mm in center for exact fixation of the plate during gluing

Description	Order-No.	Euro
Centering plate to use with adhesive, with centering Ø 33 mm, bore hole 8 mm, galvanized	**1461**	8,-

To use with adhesive and / or to screw on

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

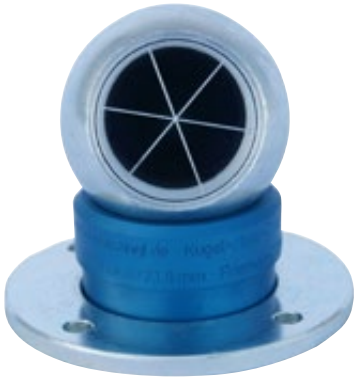
Mounting options:

- To use with **assembly adhesive** (s. page 84)
- Center bore hole Ø 8 mm for countersunk screws

Galvanized steel (magnetic) or stainless steel (magnetic)

Description	Order-No.	Euro
Centering plate Ø 33 mm, countersunk bore 8 mm, galvanized	**1464**	11,-
Centering plate Ø 33 mm, ountersunk bore 8 mm, stain. steel	**1464.VA**	14,-

TIP Choose the stainless steel version if you are working under conditions, which require increased weather resistance.



To screw on and / or nail to object

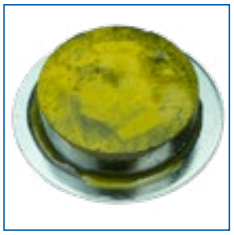
- Steel plate Ø 60 x 4 mm, galvanized, with 4 bore holes Ø 4,5 mm
- For screwing onto a wide variety of surfaces
- Accuracy of centering fit: Ø33 ± 0,1 mm
- Center bore hole Ø 8 mm for exact positioning of the plate when screwing on

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

Cover plate for centering plates Ø 33 mm

To protect the centering plates from dust and weather

The protective plate sticks reliably to the centering plate by means of a permanent magnet mounted in the middle. The curvature ensures that the disc is centred and cannot slip on the plate.



Description	Order-No.	Euro
Protective cover for centering plates Ø 33 mm, with magnet	**1453.50**	4,-

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: Ø40 ± 0,1 mm

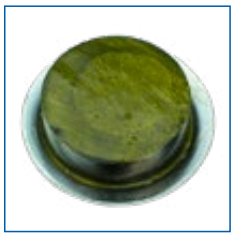
Mounting options

- To use with assemly adhesive s. page 84
- Center borehole Ø 8 mm for a countersunk screw
- Eccentric holes Ø 5 mm for 2 to 4 countersunk screws





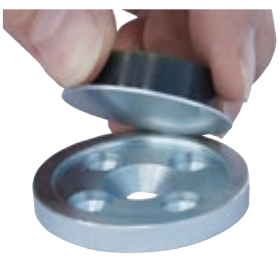
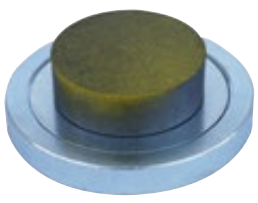

Description	Order-No.	Euro
Centering plate for base Ø 40 mm, to use with adhesive or to screw onto object	**6009**	12,-



Protective cover for centering plate 6009

The protective cover plate fits exactly into the centering Ø 40 mm of the centering plate 6009. It sticks reliably to it due to the centrally mounted permanent magnet and protects against dust and weather.

Description	Order-No.	Euro
Protective cover for centering plate Ø 40 mm, with magnet	**6009.S**	4,-

Assembly Adhesive

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

Characteristics of the adhesive

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

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.

For use with commercially available hand cartridge guns.

Description	Order-No.	Euro
Assembly adhesive, white, 1 cartridge à 290 ml	**1462**	13,-

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**	42,-

For bases with strong magnets

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

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

Protective Cap

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

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

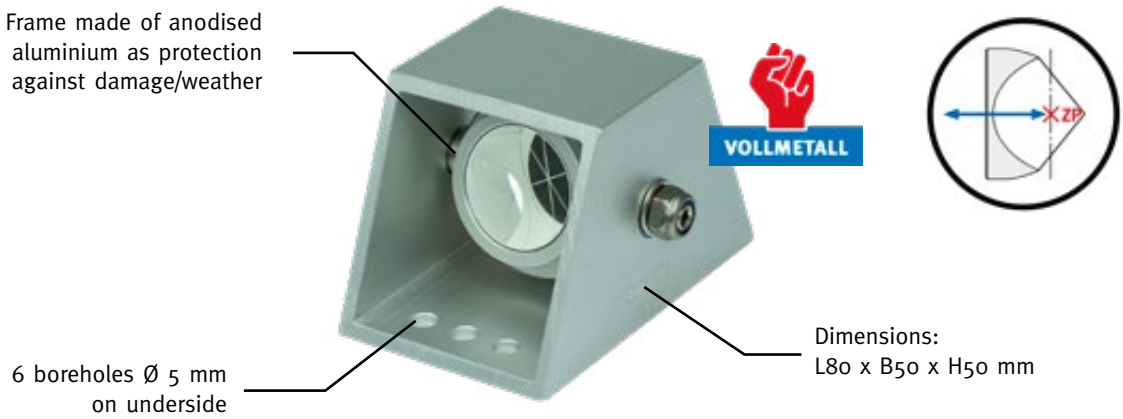
Monitoring Prism Series MoniPro

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

Prism in protective frame

Ideal for monitoring of ground points from one total station position

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



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

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

To screw onto object

Non-destructive fixing: Assembly adhesive

Monitoring Prism Series MoniPro

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

Prism in U-Frame

Ideal for monitoring from one or more tachymeter positions

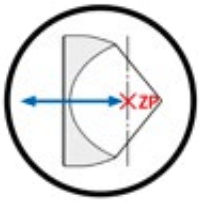
- Prism Ø 25 mm in aluminium casing, **K= -16,9** (Leica = +17,5) mm, 2-side mount
- Aligns to any tachymeter position when attached
- Tilting resistance adjustable with key (SW10) up to unchangeable fixation (picture)
- Conical frame made of anodised aluminium
- Weight: 150 g

Can be equipped with weather protection cap s. page 89

VOLLMETALL

Dimensions:
L60 x W50 x H50 mm

1 center borehole Ø 8 mm,
4 eccentric boreholes Ø 5 mm



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

To screw on or to use with adhesive

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

Non-destructive fixing with mounting adhesive

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

Screwing onto the object with centric hole Ø 8 mm

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

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 ± 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):

Screw / nail directly to object

Non-destructive fixing with mounting adhesive

On tracks (for steep views)

Magnetic base for Prism in U-Frame

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

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

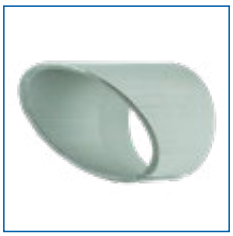
Description	Ø	Order-No.	Euro
Magnetic base with M8 outer thread, incl. V2A hexagon nut	Ø 33 mm	**1206.33**	29,-
	Ø 40 mm	**1206.40**	29,-

Our centering plates are particularly suitable for monitoring tasks with precise repeat measurements (s. page 81)

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

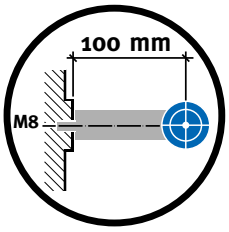


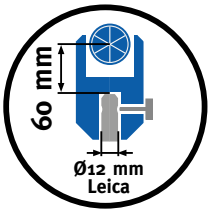
Description	Order-No.	Euro
Weather protection cap for prism in U-Frame Series MoniPro	**1201**	13,-

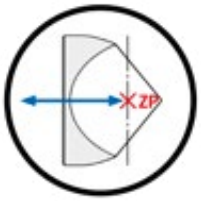
L-Bar-Prism with Leica socket

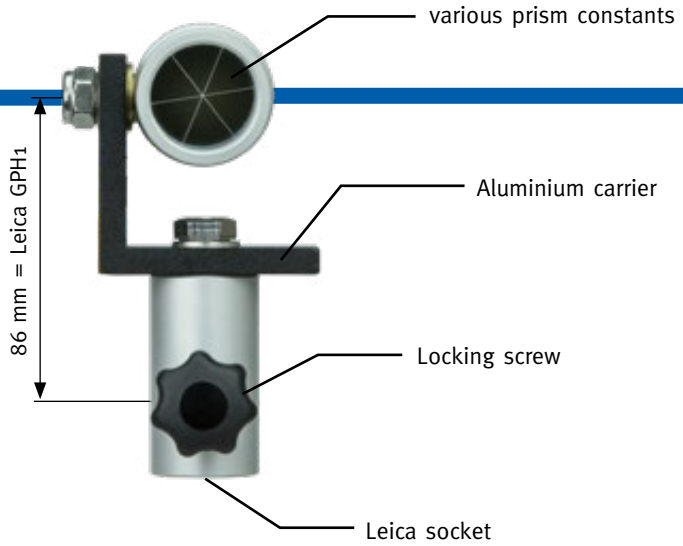
To mount Leica spigots Ø12 mm

- 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)



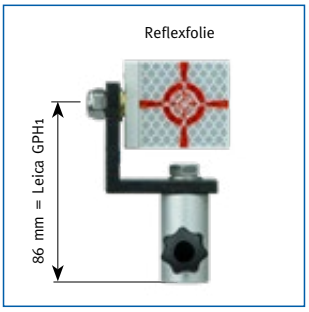






With Prism

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



With reflective foil

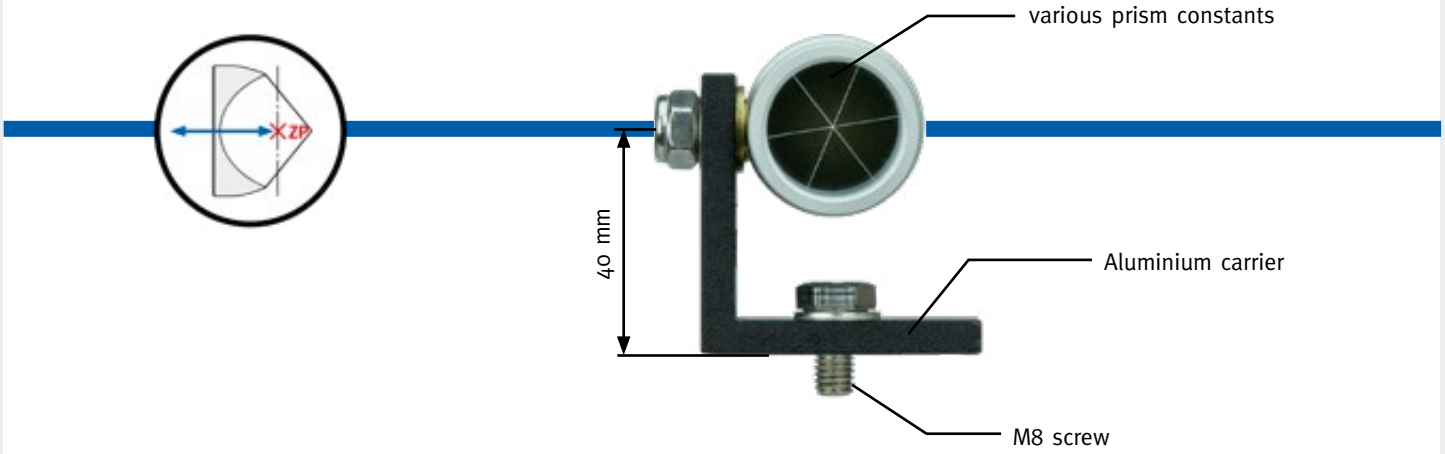
Description	Order-No.	Euro
L-Bar with Leica connection and reflective foil (40 x 40 mm)	**1022.0**	50,-

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,-
	Ø 25 mm	**-16,9** (Leica = +17,5) mm	**1005.17**	113,-
		-30,0 (Leica = +4,4) mm	**1005.30**	166,-
		-34,4 (Leica = 0) mm	**1005.34**	166,-
		-35,0 (Leica = -0,6) mm	**1005.35**	166,-

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).

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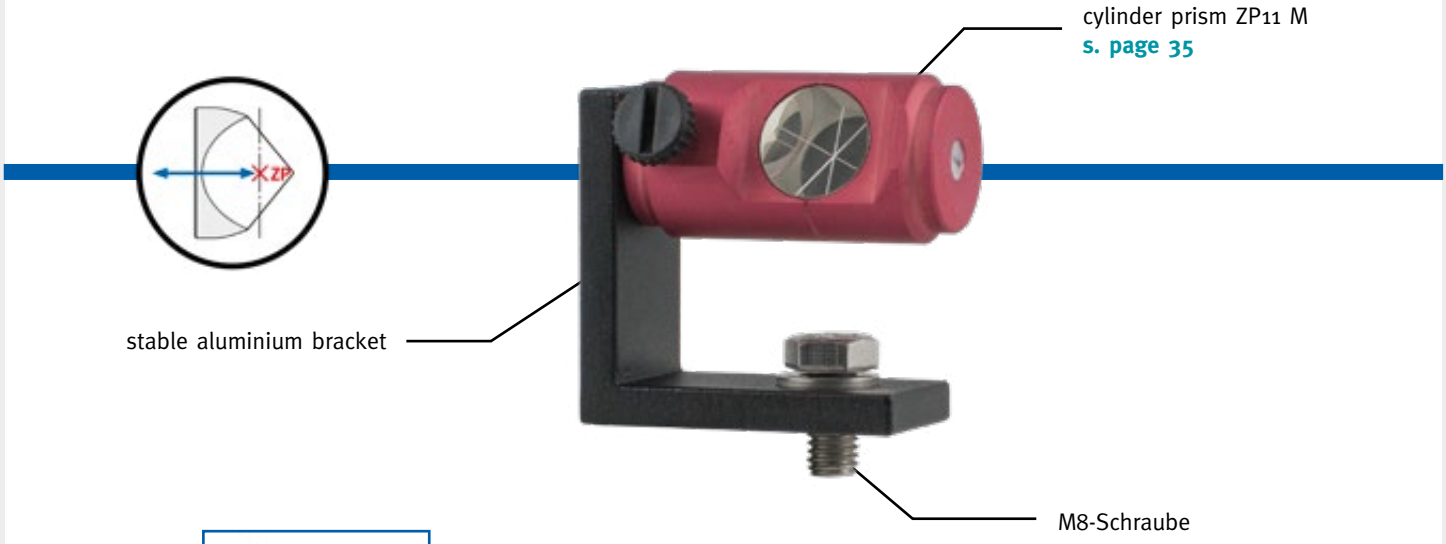
prices do not include any taxes

L-Carrier for Cylinder Prism ZP11

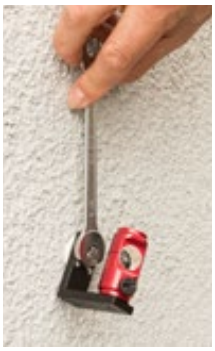
Fastening with M8 screw or with wood/plug screws

- 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 s. page 84
  - 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.



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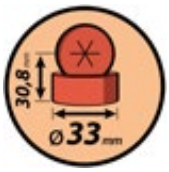
L-Bar-Prism with cylindrical magnetic base

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

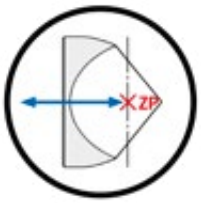


Description	foil / prism	prism constant K	Order-No.	Euro
Reflector on L-Carrier with cylindrical base with magnet **Ø 33 mm**	reflective foil target (26x40 mm)	**0** (Leica = +34,4) mm	**1060.0**	63,-
	glass prism Ø 17,5 mm	**-11,3** (Leica = +23,1) mm	**1060.11**	147,-
	glass prism Ø 25 mm	**-16,9**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

Centering plates **s. page 81**

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

Centering plates **s. page 83**



INFO

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

s. page 81

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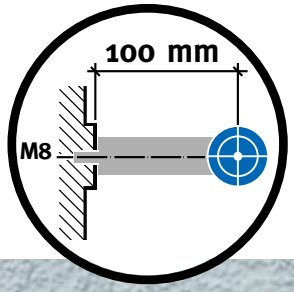


Twin-System

Simultaneous observation of an object point from several Tachymeter positions

In the AdV version (German norm) with an M8 wall bolt, the nominal point Po 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 (s. page 71) and on the other on
our **cylinder prism ZP11** (s. page 35).

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 (s. page 95)

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 Po = Center of the two prism centers
- Fixing with Allen key SW 5 (see picture)

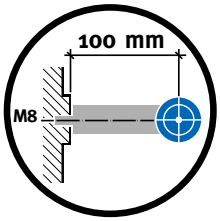
Including 2 built-in centring plates M8 No. 6150.33

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

Including 2 built-in centring plates M8 No. 6150.33

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

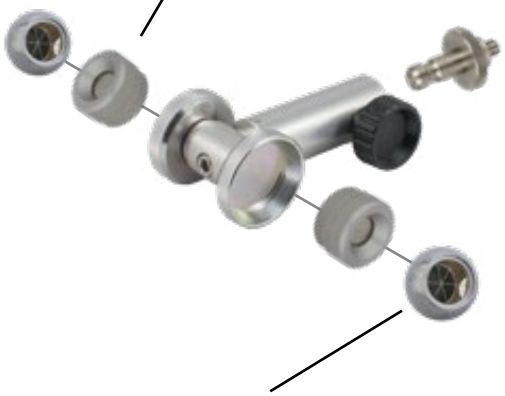
Including 2 built-in centring plates M8 No. 6150.40

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

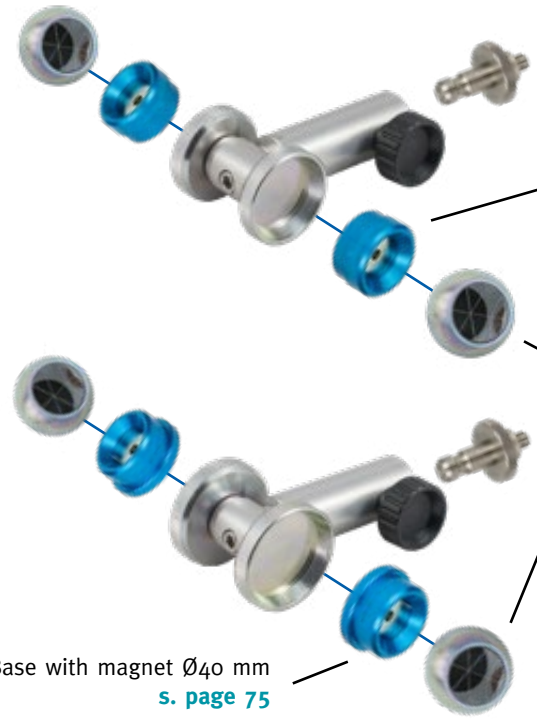
TIP If the two prisms are aligned and fixed horizontally with a spirit level (see picture), the same Z-coordinates should result during the measurement.

Leica Wall Adapter WA
s. page 52

Base with magnet Ø33 mm
s. page 74



Ball Prism Ø30 mm
s. page 71



Base with magnet Ø33 mm
s. page 75

Ball Prism Ø1.5“
s. page 72

Base with magnet Ø40 mm
s. page 75

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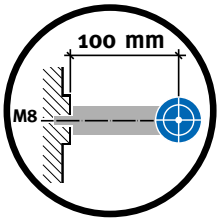
Twin-Holder for Cylinder Prism ZP11



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

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

Holder with M8 outer thread

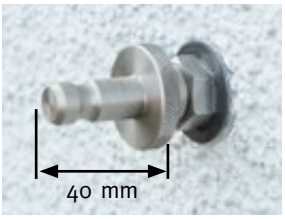
- M8 outer thread for direct screwing in of the holder in M8 wall bolts
- Horizontal drilling to help with screwing-in and screwing-out
- 2x bolts B1216 to mount the cylinder prisms ZP11
- Prism traverse rotatable at point Po = centre of both prism centers
- Fixing with Allen key SW 5 (s. picture, s. page 94)

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

Holder with Leica socket

- 100 mm distance from Po 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 52

Cylinder Prism ZP11 s. page 35

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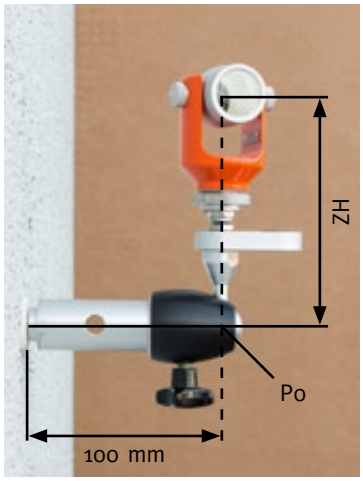
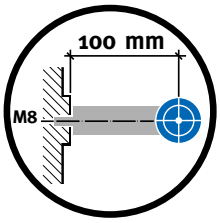


Prism holder with ball head for M8 wall bolts

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 page 20.

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.

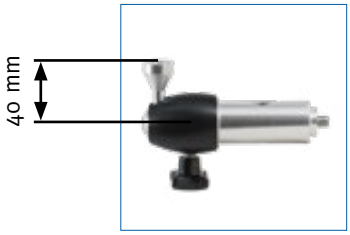


- The centre of the ball joint is located at the nominal point Po
- Quick and easy vertical positioning of the prism. After loosening the large star grip screw on the ball head, the prism holder is vertically positioned and fixed with the aid of a circular bubble.
- M8 inner thread on the ball head for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

Ball Head

Available in two designs:

To screw directly into the wall bolt



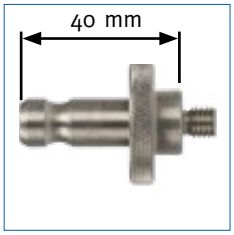
- M8 outer thread made of stainless steel for screwing into the bolt
- Lateral bore Ø10 mm to help screwing in the holder
- Distance 40 mm from ball head center Po to screw-in surface of **M8 internal thread**

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

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

- Leica bolt socket Ø12x26 mm
- Large star grip screw for fixation on the Leica bolt
- Distance 40 mm from ball center Po 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

- s. page 52

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

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M8 inner thread on ball joint

To screw in prism holders or adapters:

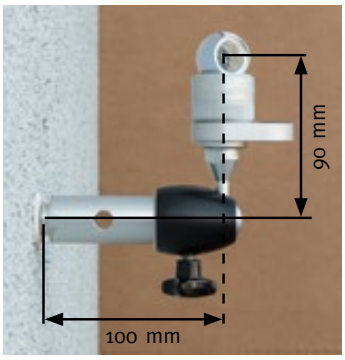
Thread base M8

- All of our ball bases with M8 outer thread s. page 76 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

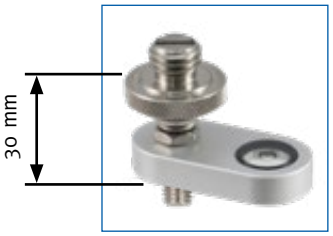
Description	Order-No.	Euro
See-through circular level (glass) **for thread base**, accuracy 30‘	**1466.B**	38,-



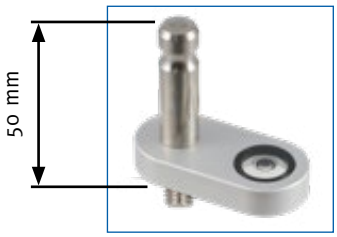
Prism adapter M8

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



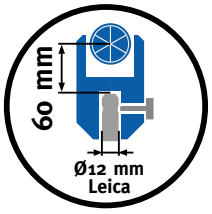
Description	Order-No.	Euro
Adapter M8 outer thread - 5/8“ outer thread, circular level 30‘	**6677.58**	50,-



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, see-through circular level 30‘	**6677.L**	36,-



For our cylinder prism ZP11

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

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**	2,26

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

HINWEIS

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,-

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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 (s. page 84).
Optionally, the perforated plate can be fixed also with screws or steel pins.

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

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

wall tripod s. page 258

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

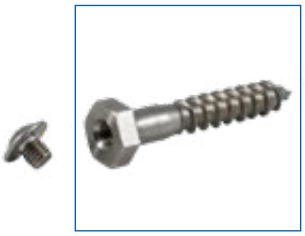
- Shaft with threaded grooves
- For bore holes Ø ≥ 14 mm
- Shipped with round head screw with hexagon socket (SW 5) for protection of the M8 thread (when not in use)

Description	Order-No.	Euro
Wall bolt 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

Page 1 of 2

Precision Measurements

Page 2 of 2

Mini vectors for tachymetric precision measurements

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

The 2-prism method „Vector“ (explanation see page 12) 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 106

Modular

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

Modular Mini-Vector
page 108

Telescopic

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

Mini-Vector Teleskop (MVT)
page 110

Accessories overview

Joint tripod M8
Art.-No. **5920**
page 114

joint tripod M8, heavy design
Art.-No. **5921**
page 114

Bipod mini tripod
Art.-No. **6640**
page 113

Switchable magnet
page 115

Suction holder M8
page 117

steel ring M8
Art.-No. **5932**
page 114

Lever clamp M8
Art.-No. **5934**
page 116

Strong screw clamp
Art.-No. **5934**
page 116

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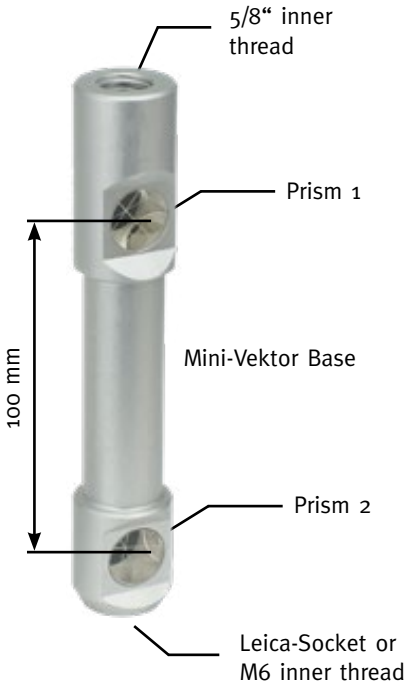
Mini-Vektor as a „rigid“ unit

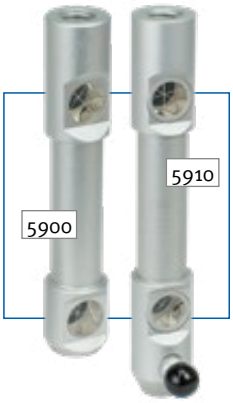
For the measurement of hidden points (mathematical extension of a base where 2 prisms are measured tachymetrically according to X, Y and Z).
The „2-prism method“ can be used very well for all points which cannot be measured or not measured exactly in the classical way, i.e. neither electrooptically with **one** prism or reflector, nor directly with a laser distance meter.

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

Usually already existing programs can be used to calculate hidden points (s. page 12).



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,-

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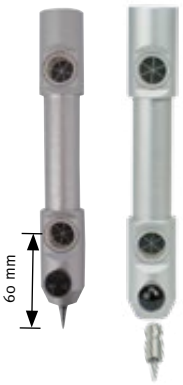
prices do not include any taxes

Extensions with hardend centering tip

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

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

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



The extension with **Leica spigot** is inserted into the Mini-Vektor and locked by a spring lock. Due to the length of the stud, the shortest possible extension dimension is L = 60 mm.
Longer extensions: s. page 55

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

Circular Level

Optionally, the mini vector can also be held vertically above the target point with a screwed-on circular level.
Then 2 prisms with different heights are available for the tachymeter aiming. The levels made of anodized aluminium have a 5/8“ external thread for screwing onto the Mini-Vektor.

Description	Order-No.	Euro
Circular level „central“, glass bubble, accuracy 30'	**1585.30**	33,-

Includes 2.5 mm Allen key.

Description	Order-No.	Euro
Adjustbale circular level „central“, glass bubble, accuracy 30‘	**1587.30**	47,-

s. page 50

s. page 114

Modular Mini-Vektor with ZP11 Cylinder Prisms

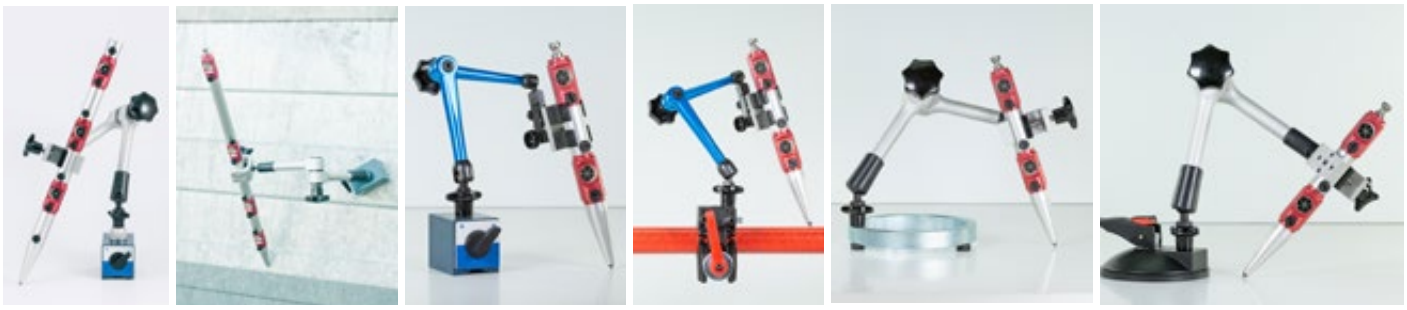
By combining several ZP11s with various extensions and a centering tip, individual prism poles with a wide range of applications can be built up. The B1216 connection system, ensures fast and precise connection of the individual components.

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

Combinations for a variety of applications

Perpendicular with circular bubble, as setting prism, changeable tip length	Angled, as „classic mini-vector“ with prism spacing 100 mm	Angled, as mini-vector with longer prism spacing and long tip	Tilted, with any number of prisms, prism spacing and tip length interchangeable	Perpendicular with circular bubble, as aiming point from different tachymeter positions

Examples of use



Elements for modular mini vector

Cylinder prism ZP11 s. page 35

- 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,-

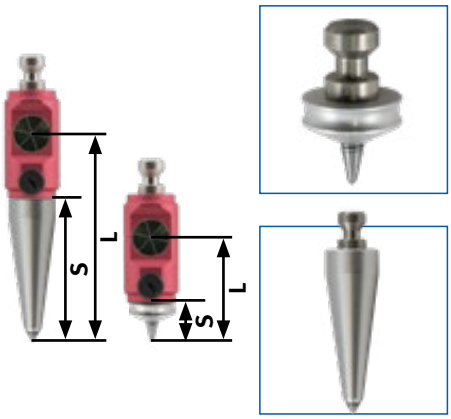
Extensions / spacers

- 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,-

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 L = 50 mm:

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

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

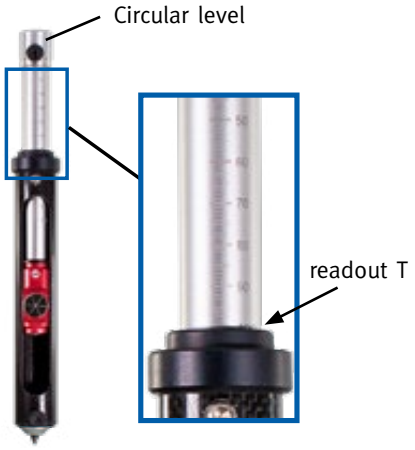
Description	Order-No.	Euro
Centering tip, length s = 70 mm, hardened mandrel, B1216 bolt	**6665**	43,-

Circular level

For vertical positioning of the mini vector

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

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



Mini Vector Telescope MVT

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

With the upper 2nd prism ZP11, the MVT can be expanded to a mini-vector. It can then also be used in an inclined position to measure hidden points. The coordination is done with the „vector method“ (sewer pole system, see page 12). Compared to the „Mini-Vector“ (see page 106) and the „Modular Mini-Vector“ (see page 108), 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**	410,-

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

Complementary items & accessories

Cylinder prism ZP11 s. page 35

- 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,-

Circular level

For vertical positioning of the mini vector

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

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

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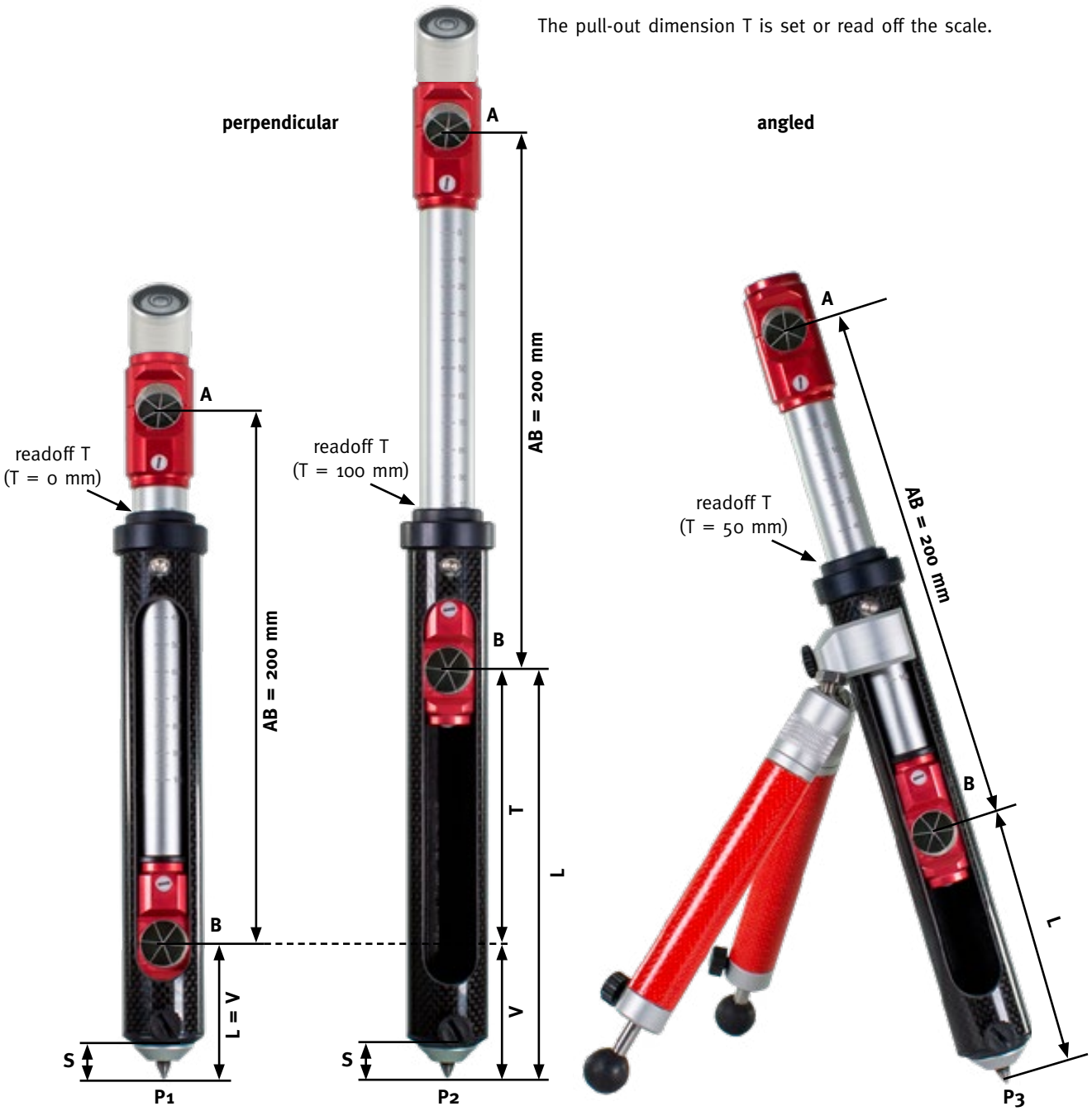
The pull-out dimension T is set or read off the scale.



Target height:
$H_B = V + T$
$H_A = V + T + 200$

L = V + T

Telescope fully retracted

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

H_B: 50 + 0 = 50 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

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

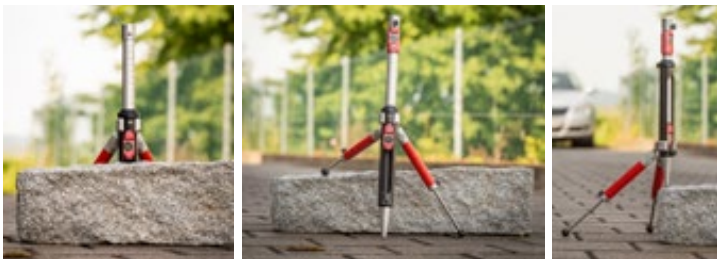
Bipod tripod for MVT

For precision measurements or longer lasting measurements on one point, a tripod is helpful. Especially when determining hidden points with the program „sewer pole / hidden points“, the mini-vector must not be changed during the measurements.
The bipod was developed especially for the mini-vector and offers some completely new features. Among other things, the mini-vector can be set perpendicular in a matter of seconds.

Bipod attributes

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

Description	Order-No.	Euro
Cripod for telescope mini-vector	**6640**	236,-



Transportation accessories for MVT

Bag

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

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

Case

For safe transport of the MVT we recommend our universal case 1468.2.
You can find other transport cases on page 253.

Description	Order-No.	Euro
Universal transport case with bubble foam	**1468.2**	29,-

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.

Bases for articulated tripod

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

Steel ring

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

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

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

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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.

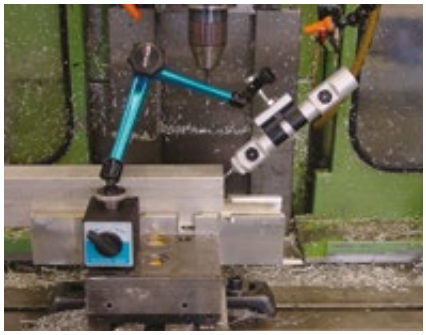
- On/Off switch
- M8 inner thread for screwing in the articulated tripod

- L63 x W50 x H55 mm
- Magnetic holding force: 600 N
- Weight: 940 g

Description	Order-No.	Euro
Magnetic base M8 for articulated tripod	**5930**	37,-

- L78 x W50 x H75 mm
- Magnetic holding force: 800 N
- Weight: 1.200 g

Description	Order-No.	Euro
Magnetic base M8 for articulated tripod, **heavy design**	**5931**	47,-



Clamp with M8 thread

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

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

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

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
- Clamping range on cylinders Ø and surfaces thickness: 13 - 55 mm
- Two M8 inner threads
- 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.)
- More information: **see page 267**

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

Suction Holder

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

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

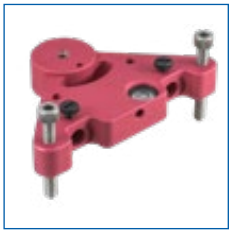
Description	Order-No.	Euro
Suction holder M8 for articulated tripod, without vacuum indic.	**5936**	48,-

Suction Holder with vacuum indicator

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

- Weight: 340 g

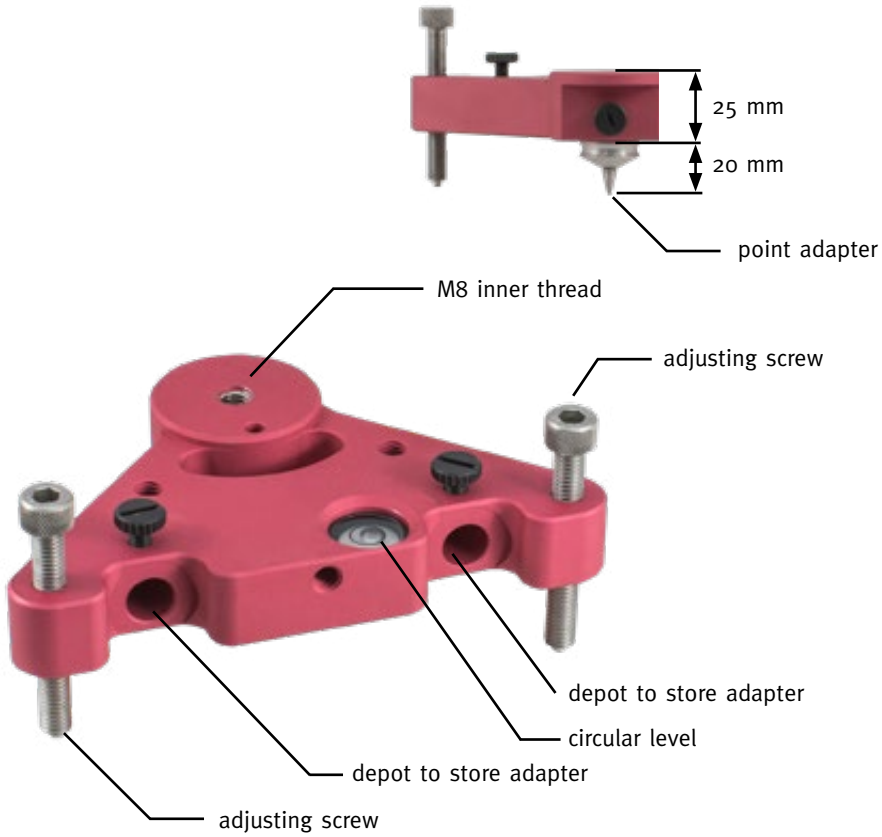
Description	Order-No.	Euro
Suction holder M8 for articulated tripod, with vacuum indicator	**5938**	80,-



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,-

Point adapters

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

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

- Outer dimensions: 275 x 230 x 80 mm
- 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**	29,-

M8 adapter for triangle tripod to prisms and targets

other prisms with 5/8“ thread

other prisms with Leica connection

horizontal use for fly-overs

5/8“ HIP prisms
s. page 23

Leica HIP prisms
s. page 25

Cylinder prism ZP11
s. page 35

Laserscanning Sphere
s. page 224

Laserscanning tagets
s. page 236

Ø1.5“ ball prisms
s. page 72

Ø270 Targets
page 236

Ø145 mm sphere
page 224
Ø200 mm sphere
page 227

Pocket Targets
page 228

Ø270 mm in U-Beam
page 235

Adapter M8 to 5/8“
s. page 52

Adapter M8 to Leica spigot
Art.-No. **0830** • 18,- €
s. page 52

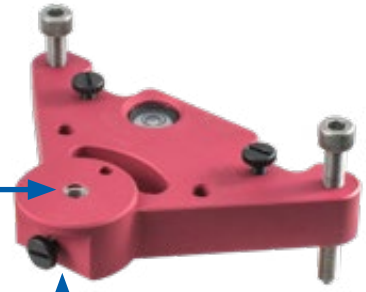
Adapter M8 to B1216
Art.-No. **6620.A** • 26,- €
s. page 165

Adapter M8 to M8
Art.-No. **6005** • 16,- €
s. page 224

M8 thread base for Ø1.5“ ball prisms
s. page 76

Centering plates
s. page 81

Magnetic quick change system
s. page 100



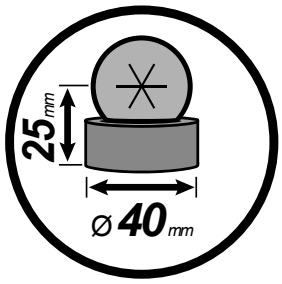
Ground Tripod
Art.-No. **6800** • 273,- €
s. page 118

Angular Stop
Art.-No. **6808** • 44,- €
s. page 119

Point Adapter „cone“
Art.-No. **6806** • 29,- €
s. page 119

Centering tip
Art.-No. **6804** • 29,- €
s. page 118

prices do not include any taxes



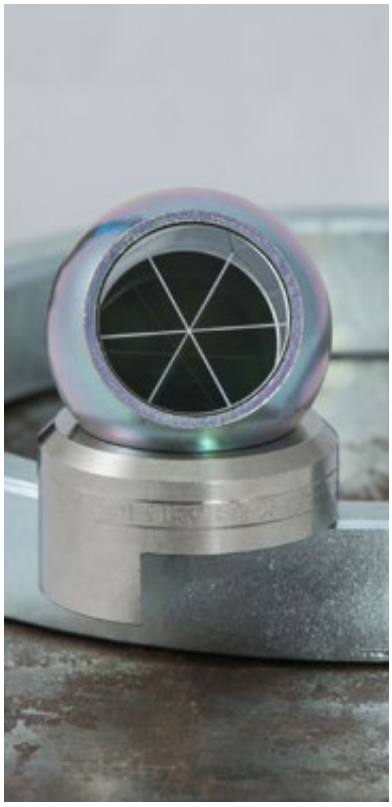
Ball prism bases for industrial 3D-Measurements

For the three-dimensional determination of points and geometries in industrial metrology. To be used with our 1.5“ ball prisms s. page 72.

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 72
- Positional accuracy of the ball in the base: ± 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

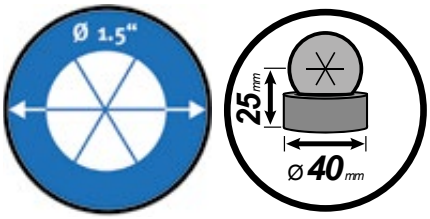


Varying magnetic strengths

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:

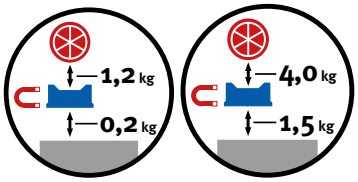
Weaker magnet:
- The base can be easily moved on the object. The ball can be aligned easily too.

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

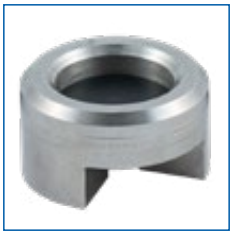


Base for measurement of corners & edges

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

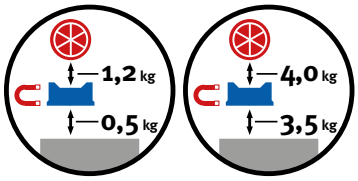


Outer corners [1]



- Lower part 270°

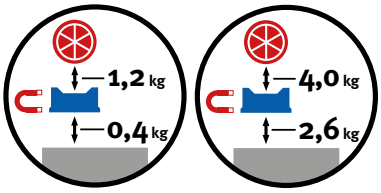
Description	magnet. holding force	Order-No.	Euro
Ball prism base **for outer corners** for ball with Ø 1.5“, stainless steel	around 1,2 /0,4 kg	**1434.A**	132,-
	around 4,0/2,6 kg	**1434.AS**	138,-



Inner corners [2]

- Lower part 90°

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



Kanten [3]

- Lower part exactly semi-circular

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

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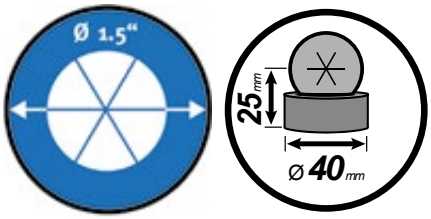


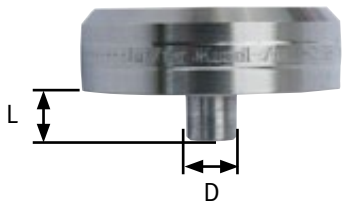
Base to measure bore holes

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 121
- Bottom part with cylindrical studs with various diameters in g6 accuracy

Description	mit Bolzen Durchmesser x Länge	magnetic holding force towards ball	Order-No.	Euro
Stainless steel base for ball-Ø 1.5“, to measure **bore holes**	Ø 6 x 8 mm	around 2 kg	**1433.06**	132,-
	Ø 8 x 10 mm		**1433.08**	132,-
	Ø 10 x 12 mm		**1433.10**	132,-
	Ø 12 x 14 mm		**1433.12**	132,-



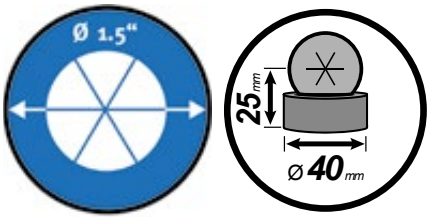
Base with M8 outer thread

For screwing into M8 inner threads e.g. wall bolt s. page 100.
Due to the small distance of only 25 mm, very accurate measurements are possible.

Features

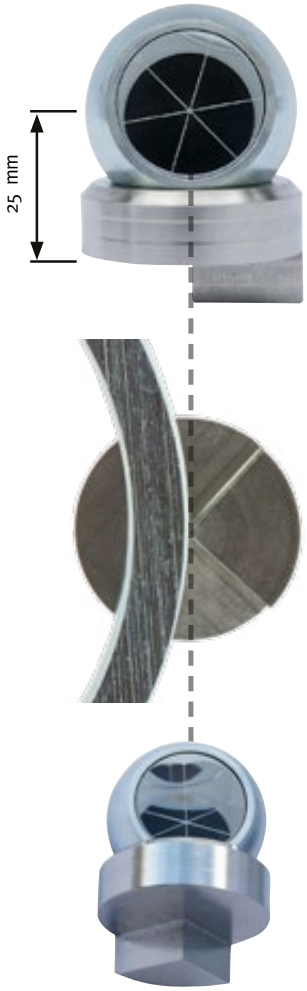
- General information: s. page 121
- Lower part with M8 outer thread, Länge 8 mm
- Holding force of the magnet: around 2 kg

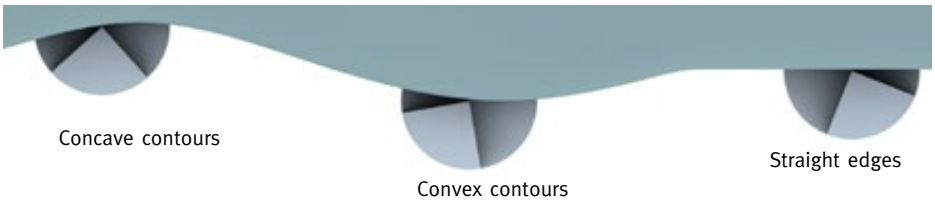
Description	Order-No.	Euro
Stainless steel base for ball-Ø 1.5" (38,1 mm), with outer thread M8 x 8 mm, with magnet	**1433.M8**	132,-

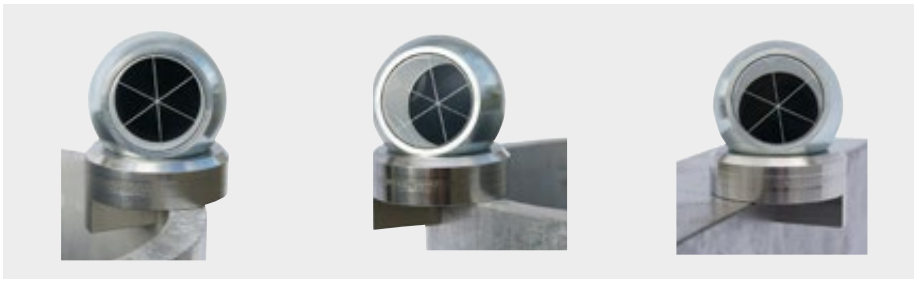


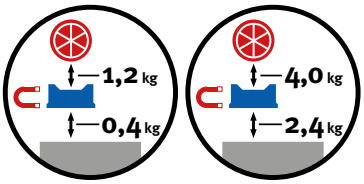
Basis for measuring contours

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.







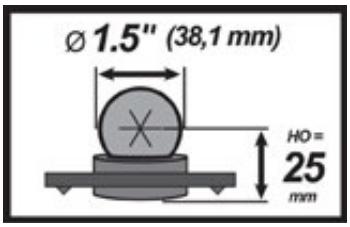


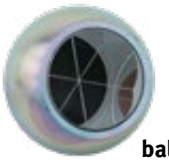
Features

- General information: s. page 121
- 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: ± 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).





ball prisms ø 1.5"
s. page 72

bases
from s. page 129

triangle frame
from s. page 126

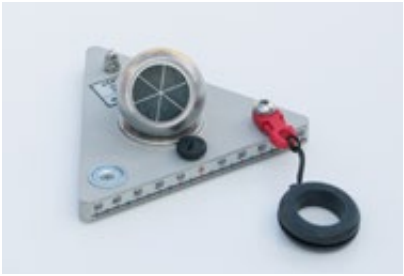
Triangle-Frame „Klimax“ for high precision point measurement on floors and walls

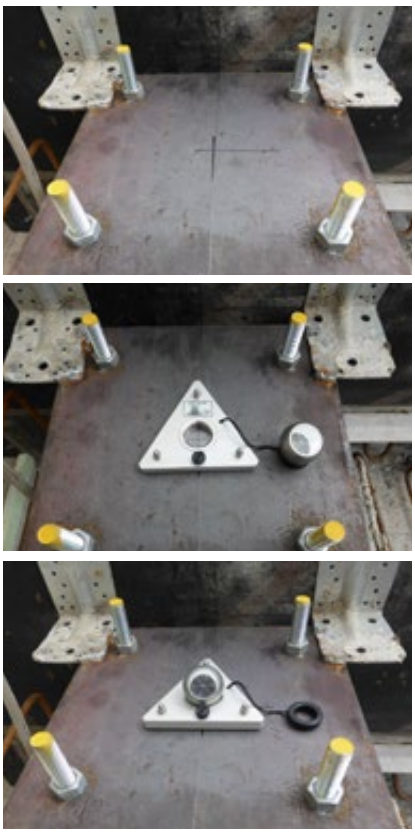
- Economical and fast
- Very accurate position and height measur.
- Reliable marking / identification of to be measured points
- Precise stake-out / control of already marked points on walls / floors
- Solid, compact design

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.





anchor plates APPLICATION EXAMPLE

Examples in practice

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 displacementof the target distance while staking out a point
- Lateral horizontal screw (SW4) for fixing the base in the triangle frame at a certain position

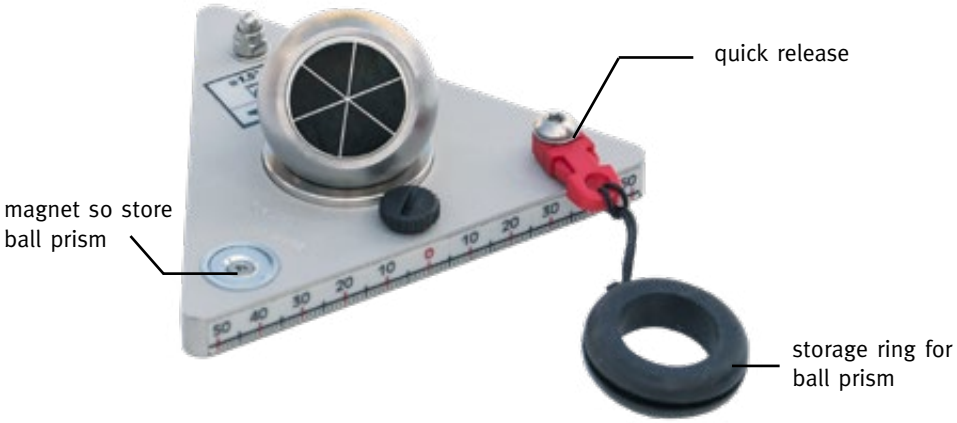
Klimax

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: 145 g.

Storage option 1
Prism on rubber ring

Storage option 2
Prism on magnet



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 127). 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.

TIP

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.
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 Ø1.5” (38,1 mm), galvanized steel, **K = -16,9** (Leica = +17,5) mm, string with quick connector for fall protection	**1444**	179,-

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

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.

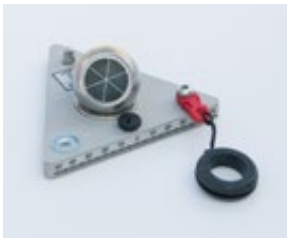
Description	Order-No.	Euro
Carrying strap (red)	**1390.R**	5,50

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.

Description	Order-No.	Euro
Triangle frame KlimaxPlus (without base / ball prism)	**1493**	252,-



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 out.

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

Stakeout and control of ground and wall points

Tachymetric measurement of the target position of the prism.

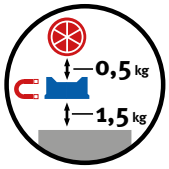
One-man method with tracking mode.

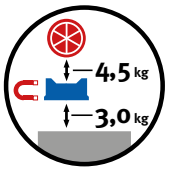
- Move the sphere prism with the triangle frame until no more differences to the target coordinates are displayed
- Remove ball from base and „store“ on tray ring
- Use a fineliner / edding or pencil to mark the centre point and 4 eccentric arrows. Hold pen vertically!
- If necessary, do a final control 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).

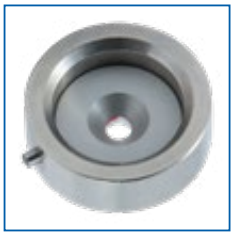
Description	magnet. holding force	Order-No.	Euro
Base AM for staking out and measuring points, with magnet	around 4,5/ 3,0 kg	**1495.M**	104,-
	around 0,5/ 1,5 kg	**1495.M2**	100,-

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

Base P for rough surfaces

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

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



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

Base PM for rough surfaces, with magnet

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

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

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

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

Measurement / control of ground points

Base B for measurement / control of marked points

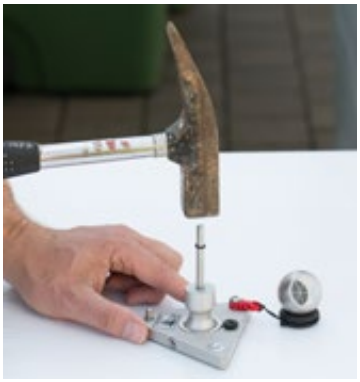
Circular, transparent centre plate with parallax-free crosshairs. The centre of a point marked on the ground or the wall can thus be found and measured very precisely. Weight: 50 g.

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

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

Stakeout with centering pin

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



Measure / control with centering pin

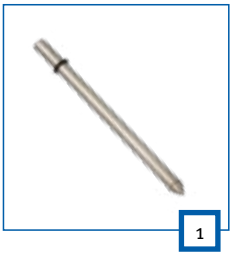
With the combination of bearing-insert and centering pin, an already marked ground point can also be centred to the base centre.

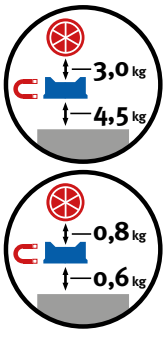
- Place the triangle frame over the point
- Push the centering pin several centimetres downwards out of the bearing-insert
- Locate the point with the tip of the centering pin, press the pin onto it
- Insert the bearing-insert into the base and center the triangular frame around the pressed-on pin
- 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 (SW_4) (see picture).

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

Transport Case

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**	42,-

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Cone Adapter

For measuring holes or bolts with Ø 20 - 60 mm

Tachymetric measuring the axis position of circular objects is difficult without special tools. Now there is a tool available which can determine the position of vertical holes as well as of vertical bolts. The cone adapter can be rotated by 180° and used upside down, depending on the application. A steel pin with the prism is inserted through the axial hole of the cone adapter. A circular level is used to set the cone adapter / steel pin / prism unit perpendicularly.

Cone Adapter

- Anodized aluminum construction
- 3 **integrated magnets** hold the cone adapter on magnetic parts
- Axial bore Ø 12 mm for steel pin (1482)
- Cut-out on both sides for optional circular level no. 1580 (see below)

Description	Order-No.	Euro
Cone Adapter for holes and bolts, Ø 20 to 60 mm	**1481**	160,-

Steel pin Ø 12 mm

- Stainless steel Ø 12 x 40 mm with mandrel
- M8 inner thread to screw on the prism holder or adapter

Description	Order-No.	Euro
Steel pin Ø 12 mm for Cone Adapter	**1482**	26,-

TIP

The tip of the steel pin stands on the top of the bolt. By taking into account the distance from the tip to the center of the prism, the correct height of the upper side of the bolt is obtained in addition to the position of the bolt.
See next page, s. page 134.



Circular level „integral“

If there is no circular level on the prism / carrier itself, the circular level must be mounted integrally (No. 1580) in the cut-off on one of the sides of the cone adapter. It ensures that the entire unit is in a vertical position.

Description	Order-No.	Euro
Circular level „Integral“ (s. page 50)	**1580**	24,-

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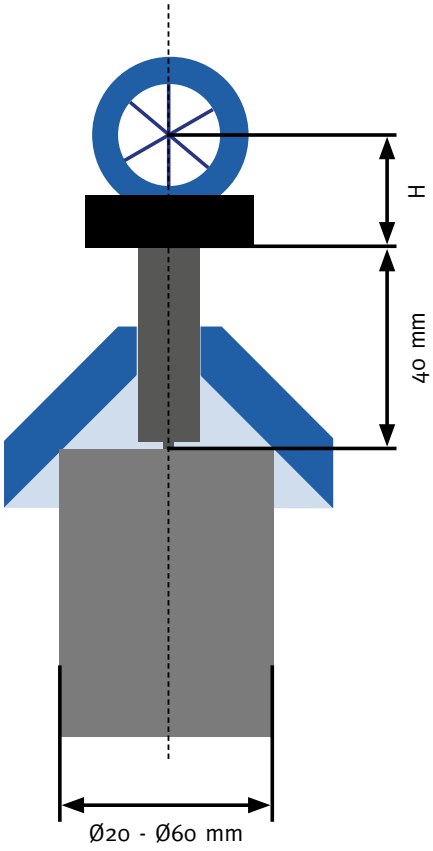
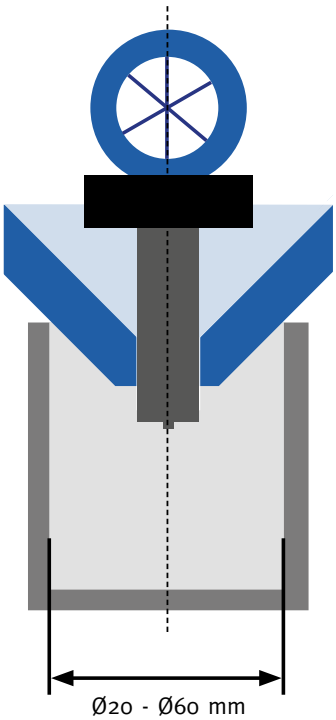


Measuring the bolt/cylinder center and height

Notes:
- The measuring result is most accurate when the cylinder to be measured is completely vertical
- The measuring result is most accurate when the top side of the cylinder to be measured is evenly horizontal
- The measurement result is most accurate when the chamfer / bevel on the cylinder edge is as uniform as possible

Procedure:
- Insert Ø12 mm steel pin (1482) with prism into cone adapter
- Place adapter on cylinder / bolt
- Use the circular level to set the level
- Take measurement

The height of the steel pin (40 mm) and the height H of the prism (+ adapter) must be added to the measured Z-coordinate.



Measure hole center

Notes:
- The measuring result is most accurate when the contact circle is as horizontal as possible
- The measurement result is most accurate when the edge of the hole is as circular as possible
- The measurement result is most accurate when the chamfer / bevel on the edge of the hole is as uniform as possible

Procedure:
- Insert Ø12 mm steel pin (1482) with prism into cone adapter
- Place adapter on hole
- Use the circular level to set the level
- Take measurement

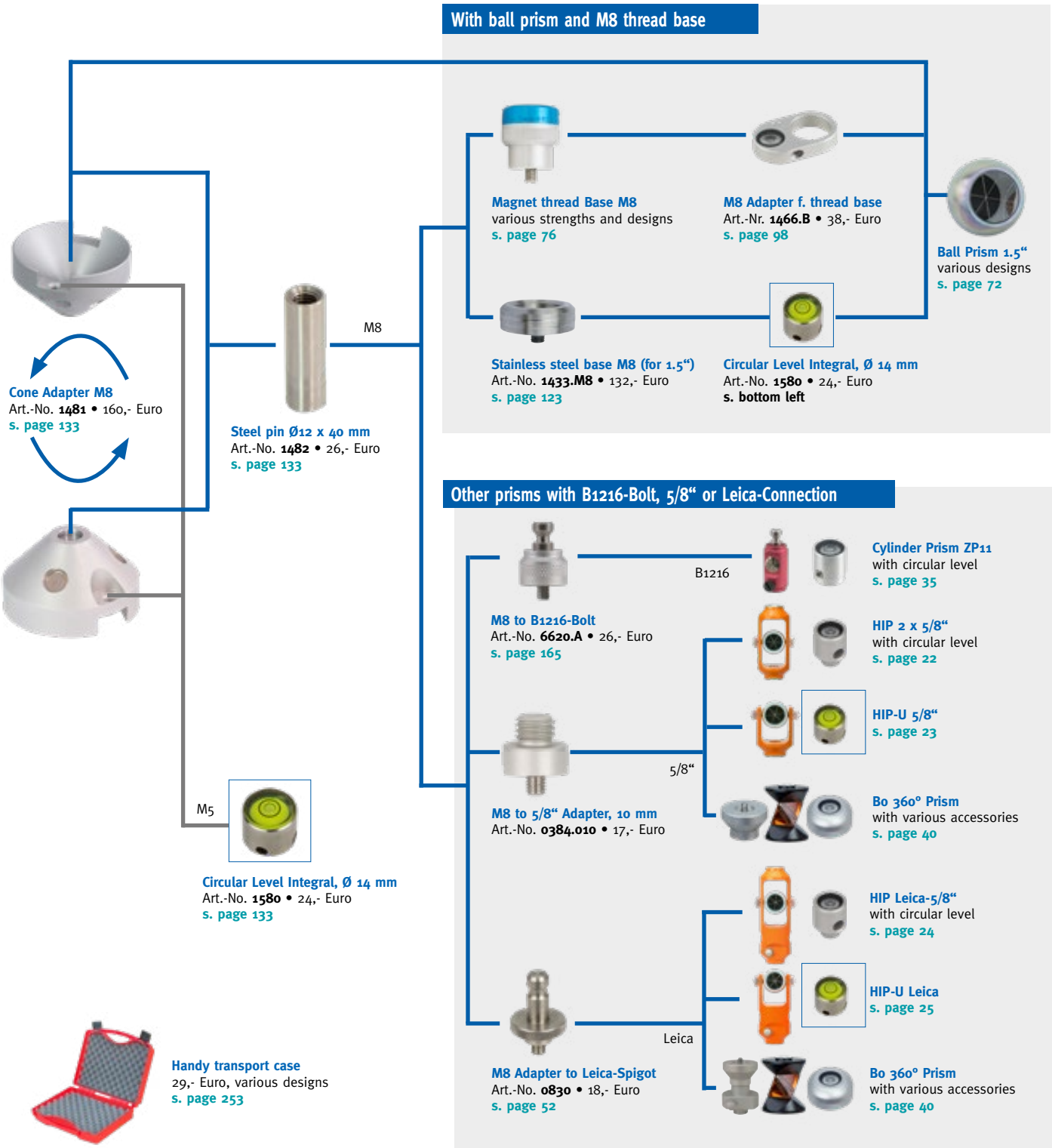
In the example here, the steel pin was not used because the cone adapter can also be used directly with the ball prism when measuring holes.

Overview of Cone Adapter Accessories

The overview shows the application possibilities of the cone adapter with prisms offered by us. With appropriate M8 adapters it can also be combined with other commercially available prisms.

TIP With low prisms, a possible vial error has only little effect and the center of gravity is close to the contact point / contact ring. This is especially the case with our ball prisms.

The measuring of **holes** can even be done without a steel pin. By inserting a 1.5“ ball prism directly into the cone adapter, a very small target height is achieved. The cut-off on the adapter must point towards the total station. For highest accuracies, however, the use of an integral level level is recommended.



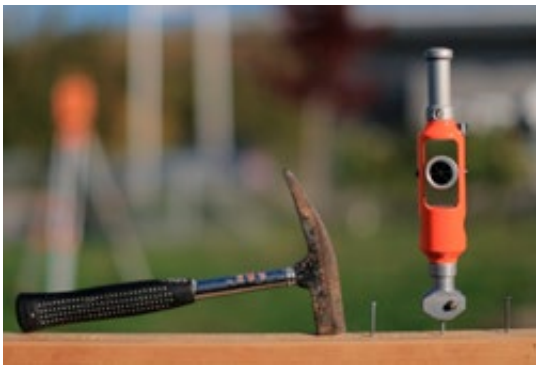
Batter boards

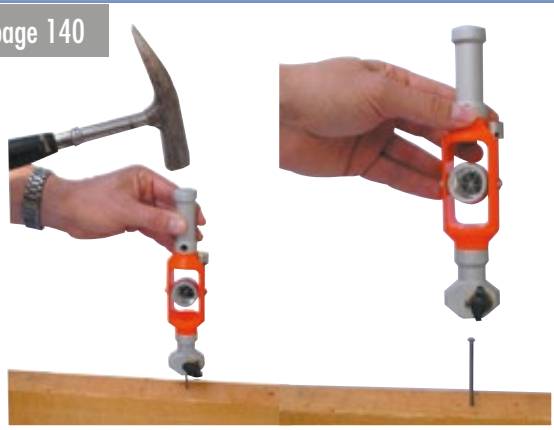
Page 1 of 1

D.1 Manual Reflector Holder page 137

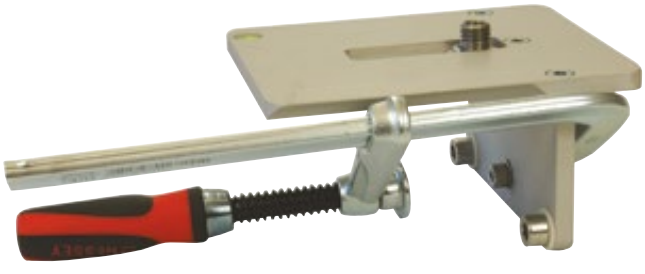
D.2 Pendulum holder for prisms / reflectors page 138

D.3 Nail Prism Holder HIT page 140





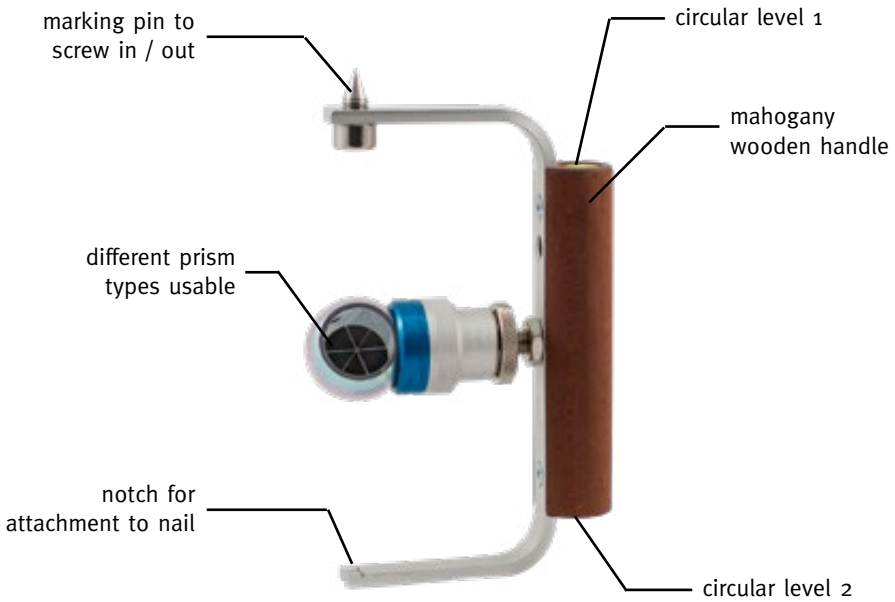
D.4 Instrument Holder 5/8" page 142



Manual Prism Holder

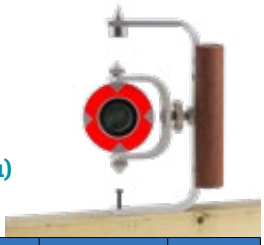
product video

- **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 23)**
- ONRT 50 with mini prism MP24 or reflective foil **(s. page 31)**
- Ball prism base 5/8" **(s. page 76)** + ball prism **(s. page 72)**

Description	Order-No.	Euro
Manual Prism Holder Type T (without prism), 5/8"	**0530**	98,-

Type EZ

Special holder for Zeiss-Prism/Reflector **ETR1**

- No adjustment of the reflector holder required
- Prism constant K = -35 mm

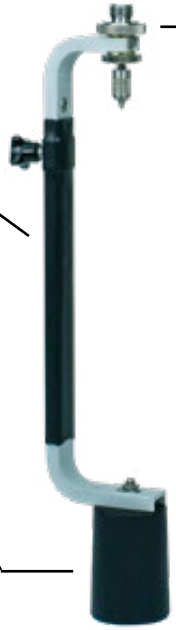
Description	Order-No.	Euro
Manual Prism Holder Type EZ (without prism)	**0550**	98,-

Pendulum Prism Holder (patented)

- Suitable for common prisms and reflectors
- Sets itself perpendicular due to its design, after putting it onto the batter boards (directly or mounted on board nail)
- No uncertainties and sources of error of manual holding
- Batter boards stakeout possible without measuring assistant

pendulum boom
telescopically extendable
(20-40 cm), with handle

pendulum weight
1500 g, makes pendulum holder stand up perpendicular



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)

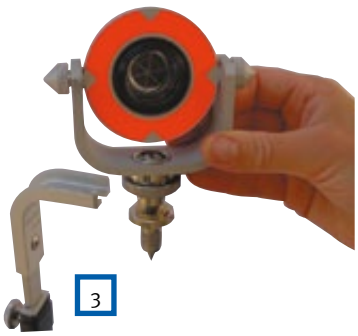
Pendulum Holder for reflectors with 5/8" internal thread

Description	Order-No.	Euro
Pendulum Holder with 5/8" external thread	**0427**	181,-

Pendulum Holder for reflectors with Leica spigot

Description	Order-No.	Euro
Pendulum Holder with Leica spigot, Ø 12 x 27 mm	**0437**	181,-
Pendulum Holder with Leica spigot, Ø 12 x 40 mm	**0438**	184,-

product video



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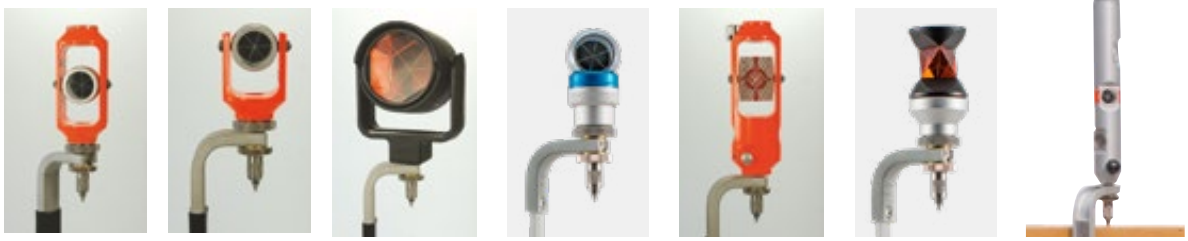
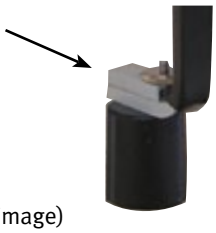
APPLICATION EXAMPLES



Accessories for Pendulum Holder



Circular Level

- To mount onto detached pendulum head
- To hold reflectors, which do not have an integrated level already, manually
- When not used level can be stored at pendulum weight (see image)

Description	Order-No.	Euro
Circular Level for pendulum holder / pendulum head	**0140**	21,-

Pendulum Head, singly

With integrated nail bit shell

Description	Order-No.	Euro
Pendulum head with **5/8" external thread**	**0121**	43,-
Pendulum head with **Leica spigot ø 12 x 27 mm**	**0181**	43,-
Pendulum head with **Leica spigot ø 12 x 40 mm**	**0181.4**	47,-

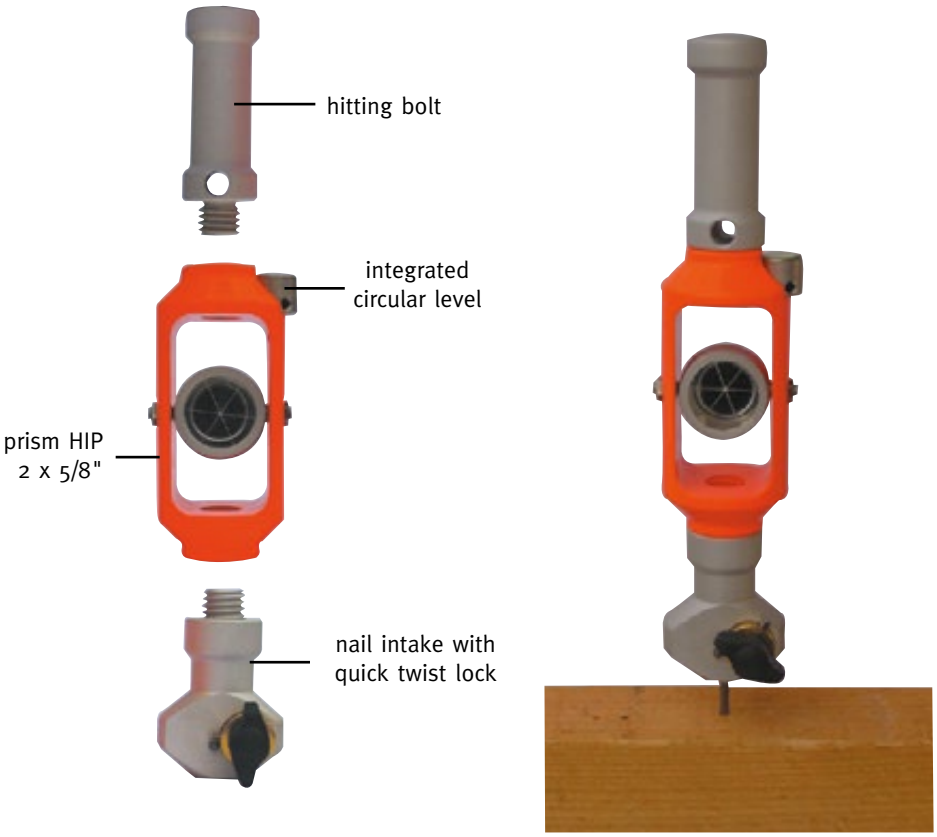
Combine: Pendulum Head and Circular Level

- Ideal for measuring up points on the batter boards or on the ground
- For all prisms with 5/8" internal thread or Leica spigot connection
- Ideal for prism holders that have no integrated circular level
- Circular Level can be turned in every direction. Guaranteed optimal visibility of the level even in difficult measuring situations

Nail Holder Prism HIT

Design and Function

- **Twist Lock**: The nail is securely fixed exactly in the vertical axis of the prism
- **Hitting-Bolt:** The nail is hammered into the board until the Nail Holder Prism stands by itself (Fig. 3)
- **Circular Level:** Holder is aligned perpendicular with the integrated level (Fig. 4)
- After removing the holder (Fig. 5) the nail is hammered into the board to the desired length, without having to hit directly onto the HIT holder



Advantages

- Can be used on all scaffold battens / batter boards, even when mounted without ground clearance
- Batter boards can be measured without assistant
- The nail to be measured immediately serves as a stakeout point. After correct measurement, the holder is removed – the nail itself remains unchanged at the measured position. A possible identity error is excluded, a further controll measurement unnecessary. After an approximation or auxiliary measurement, the nail can be pulled out of the board at any time together with the prism nail holder and placed elsewhere. Prism can be rotated together with the holder around the nail axis and aligned with the tachymeter (Fig. 1)
- Since nail and holder HIT form a solid unit during the measurement, the nail is perpendicular to the board even after removing the holder (Fig. 5)
- The nail holder HIT can also be clamped on nails already hammered. Therefore the nail has to have a visible length of at least 25 mm
- You can use all nails with a common head from a length of 50 mm up and with a Ø of 3,0 mm
- Modular design: nail holder, prism and hitting bolt can be easily separated. So the prism is also available for other applications by itself
- Available with all prism constants of common surveying systems

product video

With 2 x 5/8" internal thread

Description	Prism	Prism Constant	Order-No.	Euro
Nail Holder Prism HIT **5/8“**	glass Ø 17,5 mm	**-11,3** (Leica = +23,1) mm	**4610.11**	357,-
	glass Ø 25 mm	**-16,9** (Leica = +17,5) mm	**4610.17**	357,-
	glass Ø 25 mm	**-30** (Leica = +4,4) mm	**4610.30**	383,-
	glass Ø 25 mm	**-34,4** (Leica = 0) mm	**4610.34**	389,-
	glass Ø 25 mm	**-35** (Leica = -0,6) mm	**4610.35**	389,-

With prism constant K = 0 (only available with reflective foil)

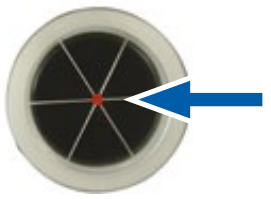
Description	Prism Constant	Order-No.	Euro
HIT, with reflective foil 26 x 40 mm, **5/8“**	**0** (Leica = +34,4) mm	**4615.0**	267,-

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

With Leica spigot

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

MORE OPTIONS



Tilting axis cones

• see s. page 21

Red marked prism center

• see s. page 21

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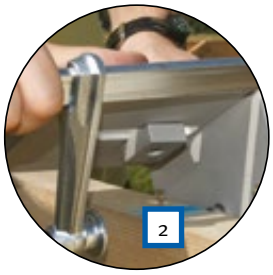
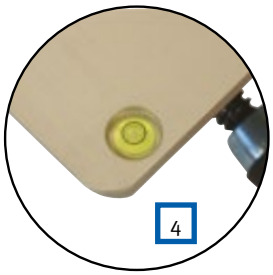
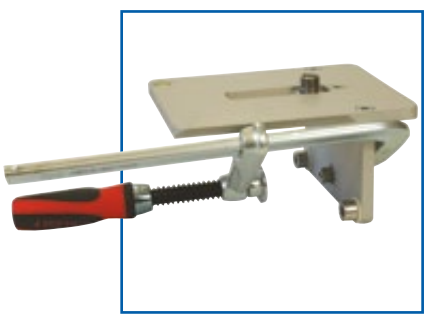






Instrument Holder

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 long-hole, no force is exerted on the axis nail when tightening the clamp.
  Screw the instrument tribrach onto the 5/8“ thread of the holder (Fig. 5). For devices without a separate tribrach they are screwed on directly
- Leveling the surveying instrument
- The instrument sits ready to measure, stable and nicely centered over the axis nail
- When dismounting, proceed in reverse order: First unscrew the instrument, then release the screw clamp and then remove the holder.
  If a separate tribrach is used, it does not have to be unscrewed completely from the holder, but a slight release of the tribrach screw connection is necessary before the screw clamp is opened

Technical Data

- 5/8" external thread centeres over the axis nail on planks, battens and squared timbers etc. over a range of 60 mm width
- To use with nails with max. head-Ø 9,5 mm
- Dimensions: 180 (300) x 150 (180) x 100 mm (incl. screw clamp)
- Total weight of the holder No. 805: around. 2,1 kg

Description	Order-No.	Euro
Instrument Holder (5/8"), max. span: **190 mm**	**0805**	194,-
Instrument Holder (5/8“), max. span: **290 mm**	**0806**	205,-

Sewer Surveying „Vektor“

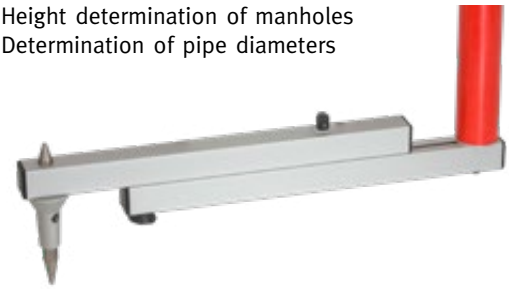
Page 1 of 1

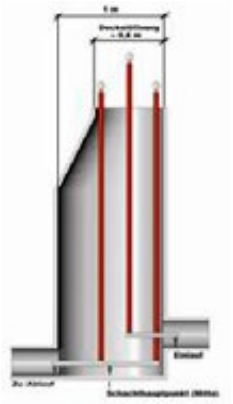
E.1 Universal Prism Pole System "Vektor" page 144

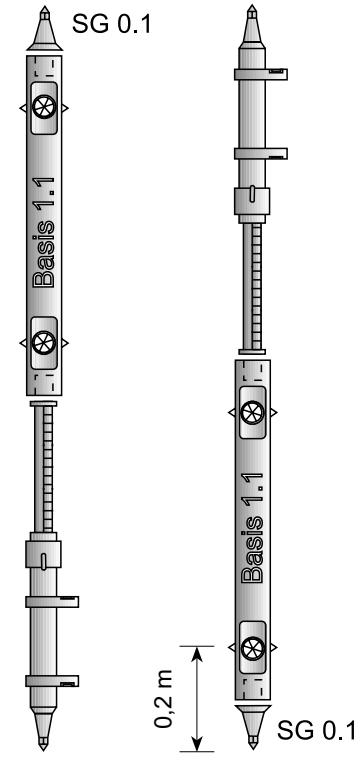
- Characteristics and applications
- System Overview
- Material and Features
- Accessories for Vektor System

E.2 Boom (eccentric) for prism poles and sewer poles page 154

- General Information
- Height determination of manholes
- Determination of pipe diameters







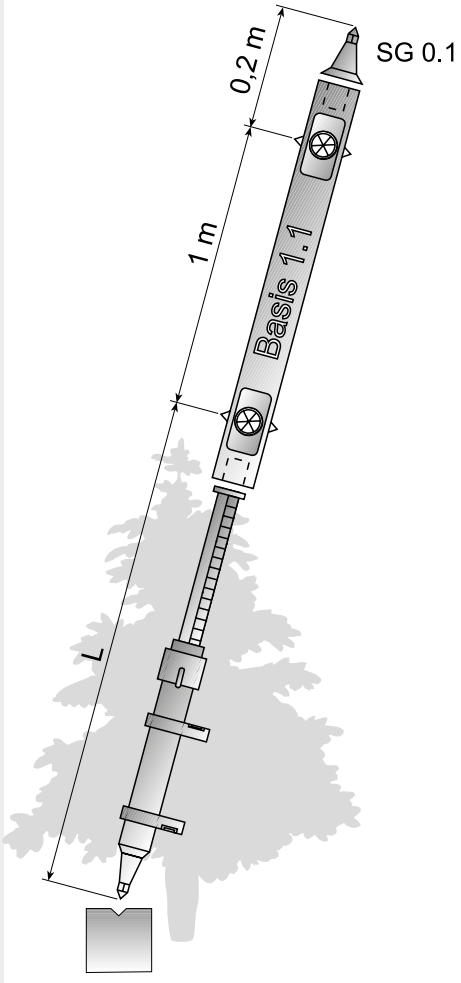
Lage I Lage II

Vektor Base as attachment for standard prism pole

The **1.1Z base** can be used on standard prism poles with 5/8“ thread. In some cases, an adapter is necessary so the scaling on the prism pole indicates the correct height up to the lower prism („Lage I“). For the height of the upper prism 1.00 m has to be added.

Without an adapter, the **1.1.W base** can be used on prism poles with Leica spigots Ø12 x 40 mm.

For targets close to the ground, the combination is rotated „up-side-down“ 180° („Lage II“). Then the base must be equipped with a tip SG0.1 and the prism pole with a double level (s. page 144). The lower prism has a target height of 0.20 m and the upper one of 1.20 m.



Vektor Base with prism pole for measuring hidden points

The combination vector base + standard prism pole is also ideally suited for measuring hidden points.

The coordinates X, Y, Z of prisms 1 and 2 are determined tachymetrically. With the target height L (reading at the scale of the standard prism pole) the 3-D coordinates of the hidden point can be calculated. The prism pole can be inclined at any angle. Only the tip must lie on the object point P and the two prisms must be aligned with the tachymeter. Of course, the position of the prism pole must not be changed between the measurement of prism 1 and 2.

This makes the use of a tripod mandatory (tripod s. page 153).

They can be used wherever points are difficult to access or a prism cannot be held upright, e.g. object points hidden by obstacles, inside corners of rooms, eaves heights, etc.
The point to be measured can be targeted both in „Lage I“ and in „Lage II“, whereby „Lage II“ in particular allows very precise coordination due to the short length of L = 0.2 m.

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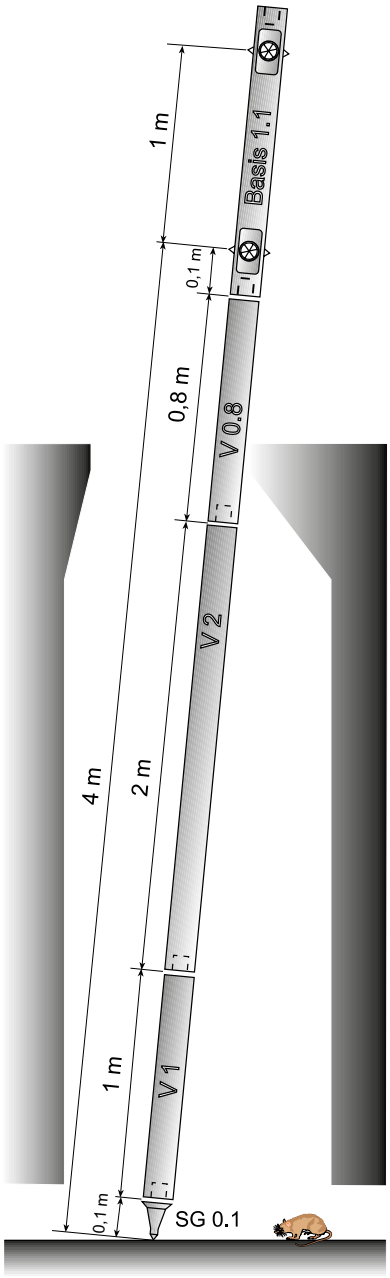


Vektor System as manhole and sewer pole

The principle of the operation is the same as for the measurement of hidden points. But when measuring „manhole depth points“ (channel bottoms, inlets, etc.), the use of normal prism poles as extensions is no longer sufficient.

Commercially available telescopic prism poles with several pull-outs have the following disadvantages:

- High weight
- Length often not sufficient
- Unstable (sag too large)
- Clamping between the individual telescopic parts too unsafe
- Scale too inaccurate
- No possibility to determine pipe diameters

All these disadvantages do not occur with the **extensions V of the Vektor system**. Due to the outstanding characteristics of the carbon fibre pole, an extension up to more than 6 m is easily possible.

Basically all system parts are connected with 5/8“ threads.

Only the connection of the base to the first extension Vo.8 W or V1.8 W takes place on the side with the Leica socket Ø12 x 40 mm.
It is required when using the measuring bracket (see next page); all other sections are again screwed together with 5/8“ threads.

The combination base 1.1 + extension Vo.8 + tip SG 0.1 has a usable length of 1 m (= distance lower prism to pole tip). With the V1 and V2 extensions, it can be extended **in full 1 m or 2 m steps as required**.

Vektor System: The best solution in regards of Convenience and precision

EXAMPLES

Base 1.1 + 4 m extension Carbon (Vo8Z, V2, V1, SG 0.1):

Weight around 2,8 kg

Base 1.1 + 4 m extension hybrid material -Carbon/GFK- (Vo8Z, V2, V1, SG 0.1):

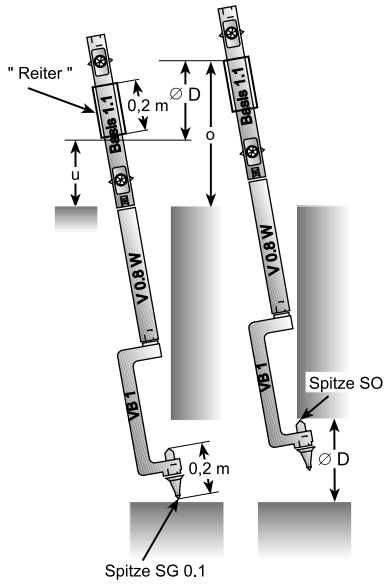
Weight around 3,1 kg

Additional determination of pipe diameters with the use of a measuring bracket VB1

Often all channel data could be measured without going down the manhole if the determination of the nominal diameters of the sewer and the inlets would be possible from above.

This problem is solved by the measuring bracket VB1:
- Can be screwed onto extensions Vo.8, V1 or V2 with 5/8“ thread
- Extremely light and rigid due to carbon fibre construction and aluminium profile
- Additional tips SO for measuring pipe apexes

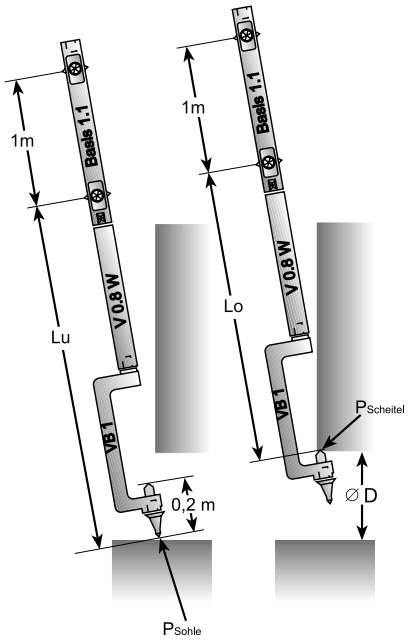
The internal diameter D can be determined for pipes with **D › 0.2 m**.
This is possible in 2 ways:



1. Measurement of pipe diameter D on site

(The base 1.1 W is equipped with a „slide“, a 20 cm long plastic sleeve that can be moved between the two prisms).

a.) Placing the canal measuring pole on the pipe bottom with tip **SG 0.1**.
---› Reading the vertical distance **u** of Slider **bottom** edge up to reference level (street) with pocket rule or tape measure. To do this, the Slider is moved to a „round“ dimension for easier calculation. (for example 0.9 m).
b.) Mount the sewer measuring pole with **tip SO** at the apex of the pipe.
---› Reading the vertical distance **o** of Slider **top** edge up to reference level (for example 1.3 m).
c.) pipe diameters **D = o-u** (for example D = 1.3 m - 0.9 m = 0.4 m).



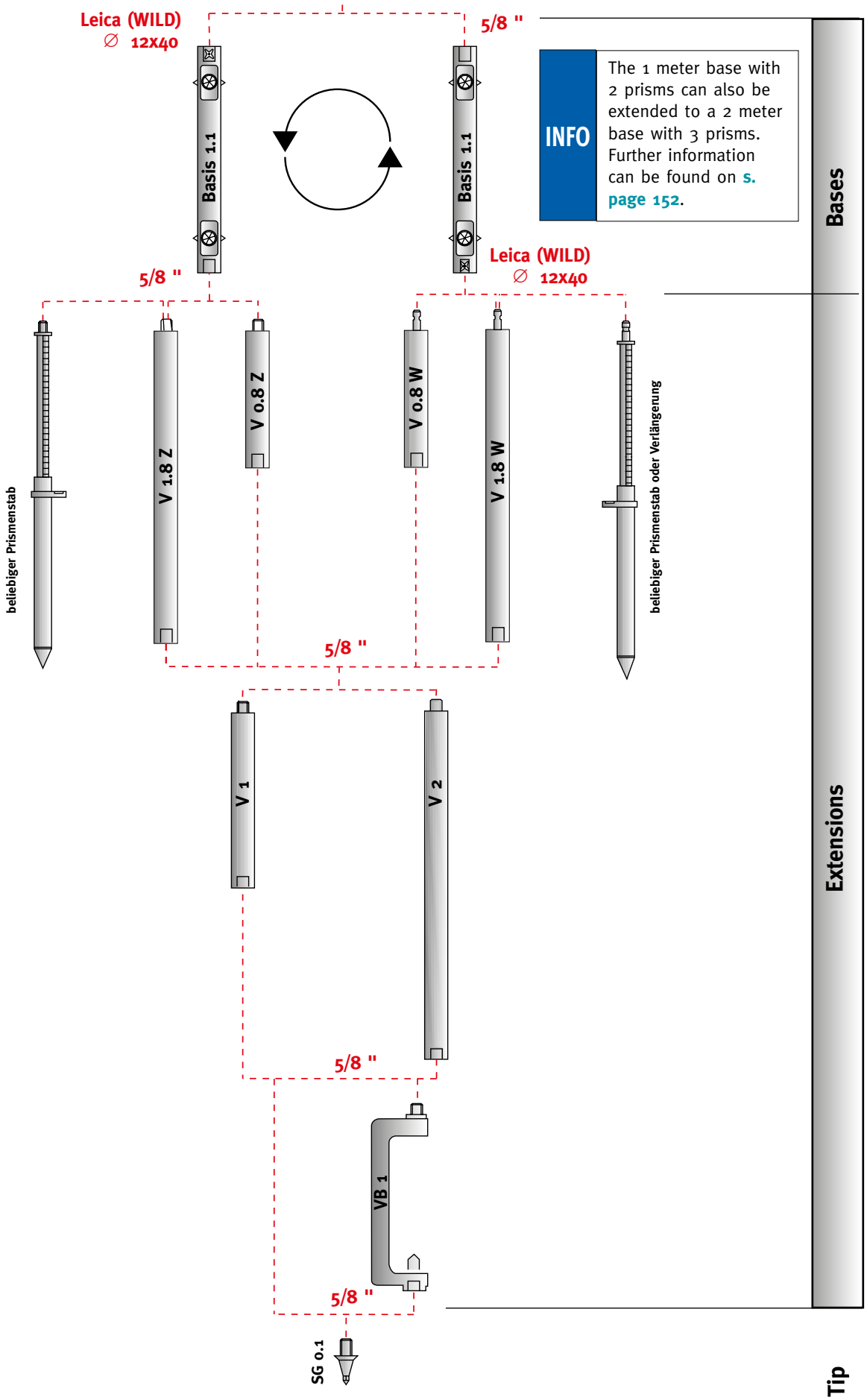
2. Determination with tachymeter

a.) Mount the sewer measuring pole with **tip SG 0.1** at the apex of the pipe.
---› Calculation of coordinates X, Y, **Z** of point P_{Sohle} by measuring prism 1 and 2 and input of the extension dimension L_u (z. B. L_u = 2 m).
b.) Mount the sewer measuring pole with So at the apex of the pipe.
---› Calculation of coordinates X, Y, **Z** of point $P_{Scheitel}$ analog point P_{Sohle} by input of the extension dimension of $L_o = L_u$-0,2 m (example: L_o = 1.8 m).
c.) Pipe diameter **D = $ZP_{(Scheitel)}$ - $ZP_{(Sohle)}$**

In order to align the base with the synchronously tiltable prisms independently of the VB1 measuring bracket on the total station, a sensible use of the measuring bracket is only possible in combination with the base 1.1 W + Vo.8 W or V1.8W (Leica spigot).

Between the extension Vo.8 W / V1.8W and the measuring bracket VB1 any extensions V1 and V2 can be added (5/8“-thread).

System Overview



Material and Characteristics

The bases and extensions of the Vektor system are available in two different materials.

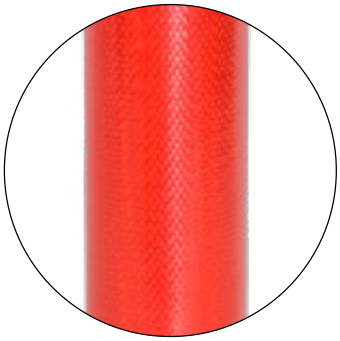
Composite: 100 % carbon fiber (carbon, CFK)

- Outer-Ø 44 mm, Inner-Ø 40 mm
- Unrivalled light (around 40% lighter than aluminium)
- High bending stiffness
- Not permanently deformable (100% resetting to original shape even after extreme stress)
- Around 100 times lower coefficient of expansion than aluminium (temperature)
- No corrosion
- Pleasant handling even in cool weather conditions
- New since 2017: impact-resistant, wrapped cover, signal red
- All extensions are waterproof
- Thread and thread inserts made of stainless steel
- 100% Carbon as base material

Hybrid: Carbon-/Glass fibre (CFK/GFK)

Properties of the hybrid material same as the poles which are made of 100% carbon, but:

- Slightly higher weight (nevertheless approx. 15% lighter than aluminium)
- Red outer layer
- Lower material price

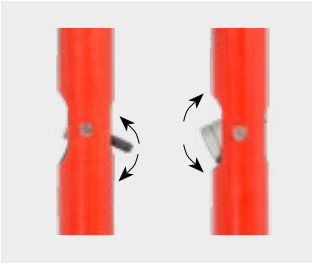


Special features of the prism base

Synchronous tilting of the two prisms

The tilting takes place either:

- With a rocker arm at the back (prism constant K = -11,3 and -16,9 mm)
- Or by using the prism housing (prism constant K = -30, -34,4 and -35 mm)



Red marked prism centers

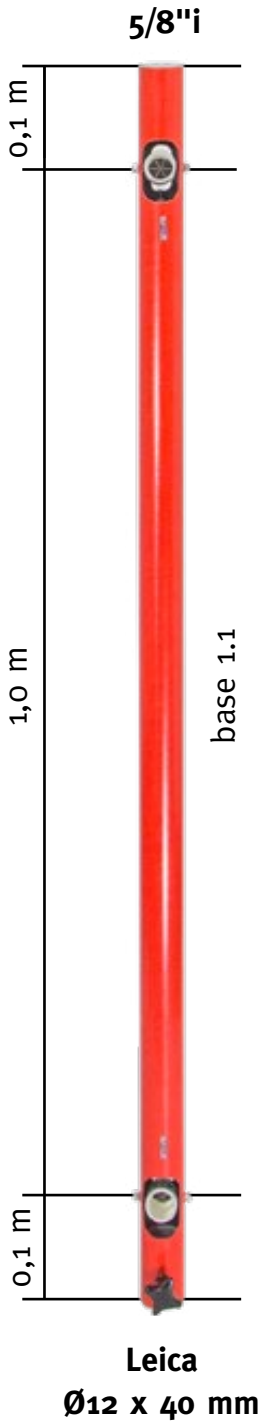
Prism base for the Vektor System

- Prism body fully integrated in pole body
- Inserts made of aluminium, internal thread 5/8“ made of stainless steel
- All glass prisms Ø 25 mm (except prism constant -11,3 mm: Ø 17,5 mm)
- Prisms equipped with red marked prism centre (see previous page)

INFO For all constants, the tilting and vertical axis runs through the red marked visible prism centre (centrally symmetric point).

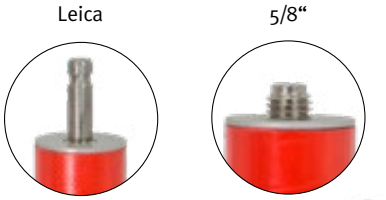
2 connections: Leica socket & 5/8“ inner thread

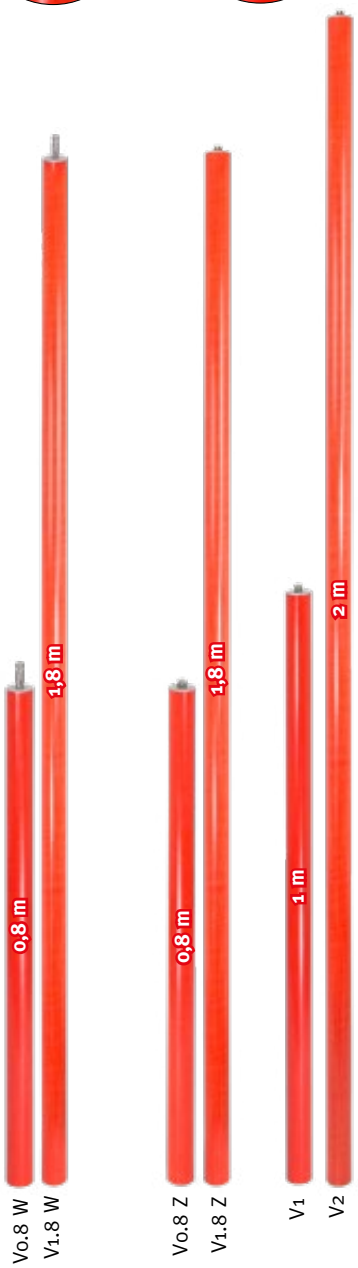
The base can be put onto the extension Vo.8W or V1.8W with the spigot connection. It is secured with a horizontal screw with star grip.
If you turn the base around you alternatively can use the 5/8“ inner thread.



Leica
Ø12 x 40 mm

Vektor Base 1.1				
Material	approx. Weight	Prism Constant K	**Order-No.**	Euro
100 % Carbon	850 g	**-11,3** (Leica = +23,1) mm	**2004.11**	1.185,-
	850 g	**-16,9** (Leica = +17,5) mm	**2004.17**	1.185,-
	900 g	**-30** (Leica = +4,4) mm	**2004.30**	1.242,-
	900 g	**-34,4** (Leica = 0) mm **-35,0** (Leica = -0,6) mm	**2004.34**	1.254,-
Hybrid Carbon / GFK	870 g	**-11,3** (Leica = +23,1) mm	**3004.11**	987,-
	870 g	**-16,9** (Leica = +17,5) mm	**3004.17**	987,-
	870 g	**-30** (Leica = +4,4) mm	**3004.30**	1.040,-
	870 g	**-34,4** (Leica = 0) mm **-35,0** (Leica = -0,6) mm	**3004.34**	1.050,-





Extensions

All extensions have a 5/8“ stainless steel thread at the top and a 5/8“ female thread with stainless steel insert at the bottom. Exceptions are V0.8 W and V1.8 W, which have a stainless steel spigot Ø 12 x 40 mm at the top.

First extension

The first extension of the base is 0.8 m or 1.8 m long. Together with the 0.1 m at the base and the top (0.1 m) results in a full m-amount.

When using the Leica socket of the base

Description	Material	Weight	Order-No.	Euro
Extension **V 0.8 W** Length = 0.8 m	Carbon	450 g	**2014**	344,-
	Carbon / GFK	490 g	**3014**	228,-
Extension **V 1.8 W** Length = 1.80 m	Carbon	810 g	**2054**	559,-
	Carbon / GFK	890 g	**3054**	324,-

When using the 5/8" inner thread of the base

Description	Material	Weight	Order-No.	Euro
Extension **V 0.8 Z** Length = 0.80 m	Carbon	450 g	**2012**	344,-
	Carbon / GFK	490 g	**3012**	228,-
Extension **V 1.8 Z** Length = 1.80 m	Carbon	810 g	**2053**	559,-
	Carbon / GFK	890 g	**3053**	324,-

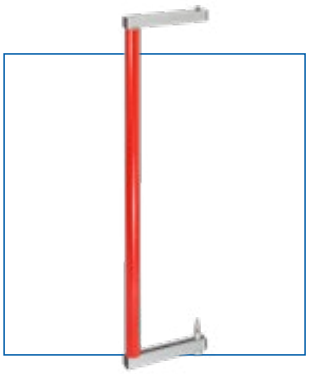
Further extensions in m-steps

Description	Material	Weight	Order-No.	Euro
Extension **V 1** Length = 1,00 m	Carbon	500 g	**2051**	382,-
	Carbon / GFK	600 g	**3051**	244,-
Extension **V 2** Length = 2,00 m	Carbon	940 g	**2052**	604,-
	Carbon / GFK	1020 g	**3052**	341,-

Tip

Aluminium turned part with V2A base and hardened tip.
Effective length: 10 cm (without 5/8“ thread).

Description	Order-No.	Euro
Tip **SG 0.1** (around 120 g)	**2050**	43,-



Measuring bracket VB1

For the determination of pipe diameters

Application description s. page 146.
Bracket arm made of aluminium profile. Additional tip for apex made of aluminium/ stainless steel. Length 1.00 m. Including Slider No. 2056 (see below).

Description	Order-No.	Euro
Measuring bracket **VB 1** Carbon (around 1100 g)	**2055**	532,-
Measuring bracket **VB 1** Hybrid - Carbon/GFK (around 1250 g)	**3055**	396,-

INFO When using the VB1 measuring bracket, it is necessary to use a extension 0.8 m or 1.8 m **with Leica connection/spigot** s. page 150.

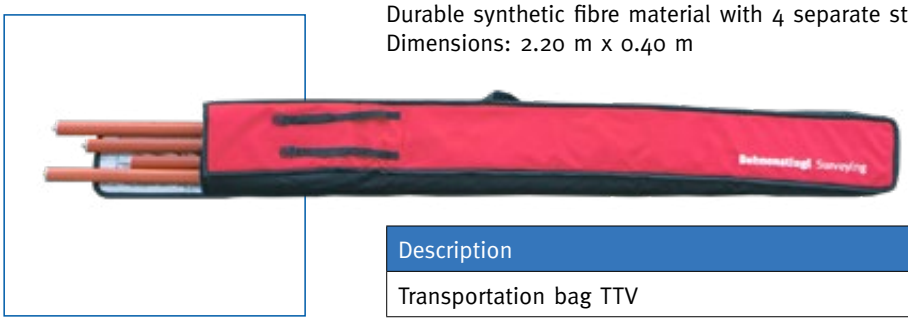
Slider

For use at the base for the determination of pipe diameters s. page 146
Plastic sleeve with Velcro fastener. Length 0.2 m.

Description	Order-No.	Euro
Slider for Vektor base	**2056**	11,-

Transportation bag for Vektor poles

For transport and storage of Vektor equipment; for pole lengths up to 8 m.
Durable synthetic fibre material with 4 separate storage compartments.
Dimensions: 2.20 m x 0.40 m



Description	Order-No.	Euro
Transportation bag TTV	**2010**	66,-

Pole adjustment holder FRG V

Pole adjusment holder with adjustable circular level and rubber tab for fixing at any point of the Vektor extensions (not suitable for high-precision perpendicular setup of the Vektor pole).

Description	Order-No.	Euro
Pole adjusment holder FRG V, for pole Ø 40-45 mm	**0950**	34,-

Base-Extension / 3. Prism

Extension of a 1-m-Base with 2 prisms to a 2-m-Base with 3 prisms

The base extension 1.0 W is connected to the standard base 1.1 W with the Leica stud bolt (spigot) connection Ø12x40 mm. The result is a 2-m-base with 3 prisms, with a spacing of 1000 mm between prisms.
The base extension 1.0 W also has a Leica stud mounting socket at the bottom, so that only the V 0.8 W or the V 1.8 W can be used as the 1st extension. All other extensions are then made as usual with a 5/8“ thread.

- Top connection: Leica spigot Ø12x40 mm
- Bottom connection: Leica stud mount (socket)
- Manual prism tilting adjustment (s. page 148)

Please ensure that identical prism constants of base and extension are used.

Base-Extension 1.0 W				
material	approx. weight	prism constant K	Order-No.	Euro
100 % Carbon	710 g	**-11,3** (Leica = +23,1) mm	**2009.11**	880,-
	720 g	**-16,9** (Leica = +17,5) mm	**2009.17**	880,-
	730 g	**-30** (Leica = +4,4) mm	**2009.30**	908,-
	740 g	**-34,4** (Leica = 0) mm **-35,0** (Leica = -0,6) mm	**2009.34**	914,-
Mixed material Carbon / GRP	720 g	**-11,3** (Leica = +23,1) mm	**3009.11**	709,-
	730 g	**-16,9** (Leica = +17,5) mm	**3009.17**	709,-
	740 g	**-30** (Leica = +4,4) mm	**3009.30**	735,-
	750 g	**-34,4** (Leica = 0) mm **-35,0** (Leica = -0,6) mm	**3009.34**	740,-

INFO A 2-m base with 3 prisms can be extended by an additional prism in 1-m increments with further extensions.

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Universal strut bipod with quick connector

2-legged stand for:
- Prism poles
- GNSS antenna pole
- Sewer poles (for example Vektor)

Advantages

- Clamping connection for all poles with diameters from 32 to 50 mm
- The strut bipod can be clamped to the pole in seconds
- No complicated and time-consuming „insertion“ of the pole from above
- Telescopic legs and ball head for easy vertical positioning even on uneven ground
- Reliable mounting of inclined poles, e.g. prism pole Vektor when used as sewer measuring pole
- Sturdy lightweight aluminium construction with red warning paint and entry surfaces

Description	Order-No.	Euro
Universal strut stand, 2 telescopic legs, quick connection	**2095**	215,-

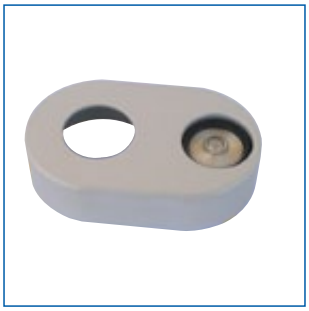
Circular level Vektor System

General information:
With the insertion circular level, the universal prism pole Vektor can be used vertically for further applications:
- Prism pole with large reflector heights
- Antenna pole for GPS measurements with high antenna height

The prism base can also be dispensed and only Vektor extensions can be used. The big advantages of the Vektor System, **-light, sturdy, precise-** are also fully effective in this application.

If desired, an extension can be adapted in length to your antenna type, so that the antenna height is always exactly round m values. Reading errors, as they can occur with telescopic slides, are thus ruled out.

Setup:
The circular level is embedded in a stable, adjustable aluminium housing. It can be used between any 5/8“ screw connection of the Vektor system. Large contact surfaces ensure an exact connection to the vector pole.

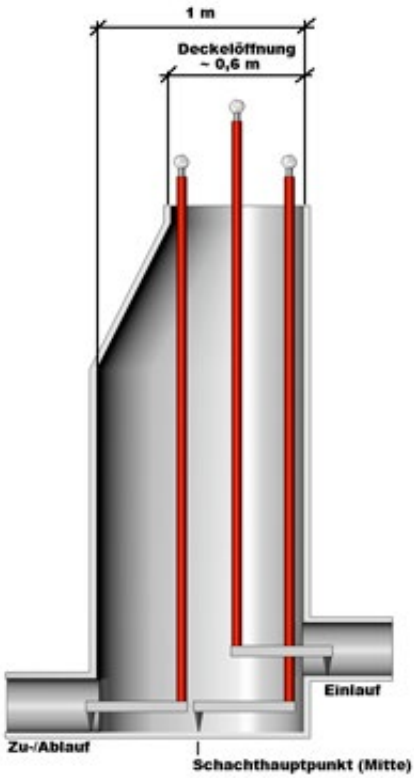


The technical features of the circular level itself:
- Metal casing with 20 mm diameter
- Ground glass with 10‘ accuracy

This allows accurate measurements even with large prism or antenna heights.

Description	Order-No.	Euro
Insertion ciruclar level EDL 10’	**2040.10**	74,-

Boom (eccentric) for Sewer / Prism poles



The position and height of the shaft points are determined by ordinarily with a sewer pole. When using our Vektor system s. page 149 the pole stands inclined in the shaft, the two prisms of the base are measured and the software calculates the coordinates of the pole tip after entering the extension length.
With the help of the measuring bracket VB1 pipe diameters of outlets and inlets can also be determined.

If the position of the manhole is already known, it may be necessary to determine or check the heights of points in the shaft. The described use of the 2-prism method is not absolutely necessary for this.

Height determination of manhole points with boom

With our boom and the help of vertical poles points in the manhole can be determined in height (not in position though).

For example, with a set boom length of approx. 45 cm, all points of a normed manhole DN 1000 can be measured (see sketch).

The point height itself can be determined in various ways (also depending on the accuracy requirement):

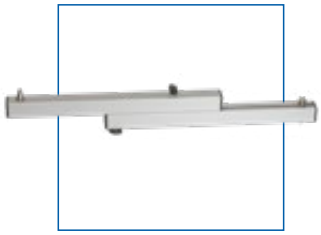
- Reading of the cut-off dimension at the top edge of the lid opening (lid height must be known)
- Measurement of a prism mounted onto the pole by a total station (input of the pole length as reflector height)
- Determination with a GNSS antenna mounted on the pole (taking into account the pole length)

Can be used on all poles with a removable 5/8“ tip

- Poles with 5/8“ female thread at bottom and tips with 5/8“ male thread, e.g. system Vektor

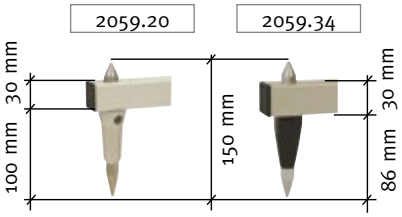
- Poles with 5/8“ male thread at bottom and 5/8“ female thread tips, e.g. many prism poles

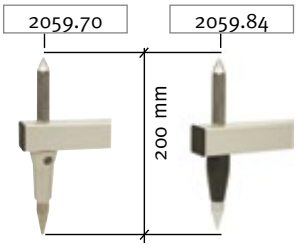
Setup & Features

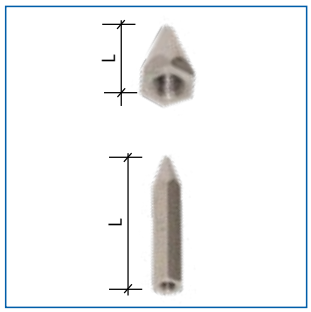


- Can be used on all poles with removable 5/8“ tip
- Sturdy profile made of anodised aluminium
- Telescopic from 0.38 m to 0.60 m, continuously variable (stepless)
- M8 stainless steel male thread centrically above the tip for screwing on the optional upper tip (see next page)
- Weight: 850 g

Description	Order-No.	Euro
Boom (eccentric) for determining the sewer / inlet height, 5/8"	**2058**	146,-







Determination of pipe diameters

Another feature is the determination of pipe diameters (nominal widths) from 15 cm. This requires a 2nd tip pointing upwards, which is available as an option.

Upward Tip

- Stainless steel hexagon, for mounting with wrench SW13
- M8 internal thread for screwing onto the extension arm / boom

Depending on the minimum diameter from which inlets are to be determined, the corresponding length of the **upper tip** must be selected so that a round distance measure between the two tips results.

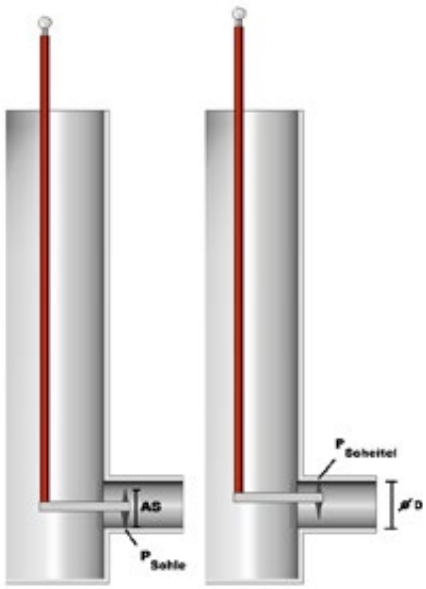
Length of the bottom tip: 50 mm (Order-No. 2059.20)
86 mm with prism pole S10
100 mm with Vektor System poles

Description	when length of the lower tip is	distance AS between upper and bottom tip	**Order-No.**	Euro
upper tip L = 20 mm	50 mm	100 mm	**2059.20**	19,-
	100 mm	150 mm	**2059.20**	19,-
upper tip L = 34 mm	86 mm	150 mm	**2059.34**	19,-
upper tip L = 70 mm	100 mm	200 mm	**2059.70**	23,-
Obere Spitze L = 84 mm	86 mm	200 mm	**2059.84**	23,-

The distance AS from lower to upper tip is the smallest measurable tube diameter.

Measurement methods

With vertically standing pole



1. Determination of the difference via the two measured points $\mathbf{P}_{Sohle}$ and $\mathbf{P}_{Scheitel}$

D = measurment point P_{Sohle} - measurment point $P_{Scheitel}$ + distance AS

2. Determination of the heights (Z-coordinates) of point $\mathbf{P}_{Sohle}$ and $\mathbf{P}_{Scheitel}$ with the tachymeter by means of a prism attached to the pole.

3. Determination of the heights (Z-coordinates) of point $\mathbf{P}_{Sohle}$ und $\mathbf{P}_{Scheitel}$ with the help of a GNSS antenna mounted on the pole.

Please note for 2. and 3.: The target height of the measurement $\mathbf{P}_{Scheitel}$ is different from the measurement $\mathbf{P}_{Sohle}$ and the distance of **AS** lower.

The pipe diameter D is then calculated according to the following formula:
D = height $\mathbf{P}_{Scheitel}$ - height $\mathbf{P}_{Sohle}$

D = height P_{Sohle} - height $P_{Scheitel}$

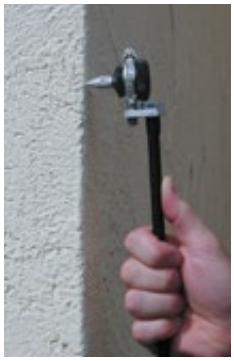
Building / Structure Surveying

Page 1 of 1

F.1 Precision Prism 17.5 & Chamfer Prism Angle page 157



F.2 Flexible Prism Holder „gooseneck“ page 159



F.3 Offset-Measurements of Building Corners page 160



F.3 Measurements of Building Dimensions

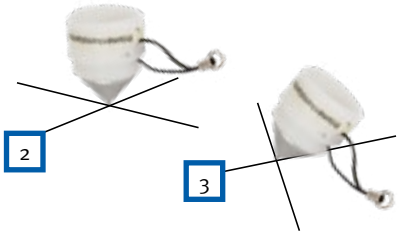

page 276

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

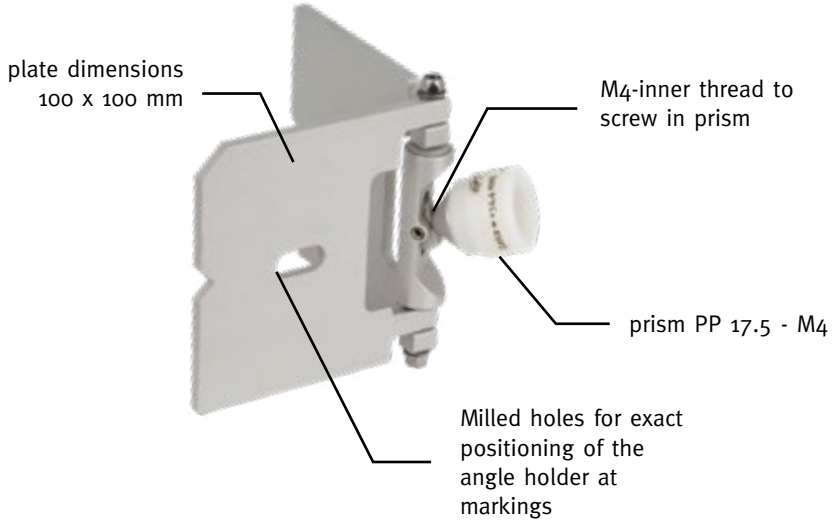
Concrete construction elements usually have a chamfer for structural and aesthetic reasons. Their measurement with the tachymeter is often not quite easy, since the constructive edge of the component (intersection of the 2 planes - without chamfer) cannot be stopped exactly with a standard prism.

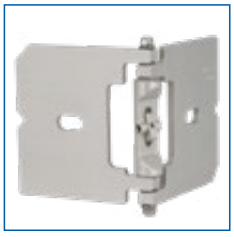
For these cases we developed the special **holder for concrete components with chamfers SBF**. It can be used for all components with a chamfer width of 20 mm or more and is ideally suited for the positioning of precast concrete elements as well as for the inspection of elements concreted on site.

SBF Flexible Prism Holder for Edges

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

Alignment limits of prism





Description	Order-No.	Euro
SBF Flexible prism holder for concrete chamfers (**without prism**)	**1485**	247,-

Precision Prism PP 17.5 – M4

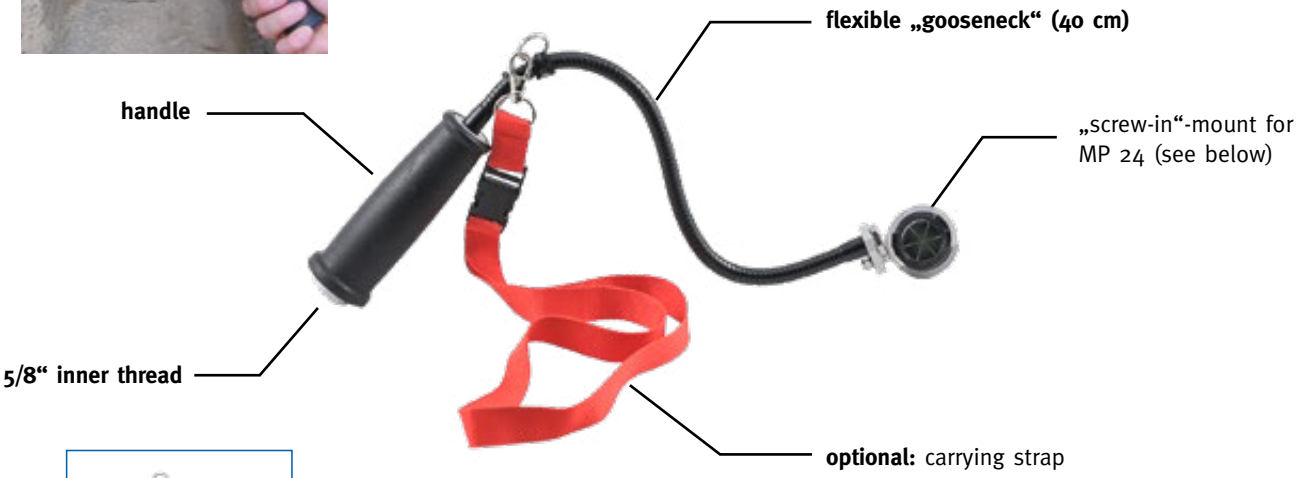
- Backside: M4 outer thread (stainless steel)
- **Prism constant** if used with SBF flex prism holder: **K = o (Leica = +34,4) mm**

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 s. page 157

Flexible Prism Holder „gooseneck“

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



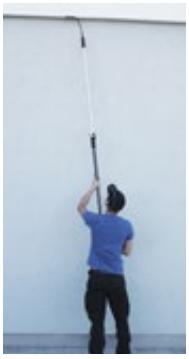
Description	Order-No.	Euro
Flexible prism holder „gooseneck“ (**without prism**)	**0741**	95,-

Accessories

Description	Order-No.	Euro
Mini Prism MP24 (s. page 30)	**1400**	100,-

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

INFO Special equipment: Mandrel extensions s. page 33.

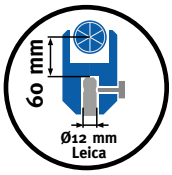


Extension

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

With a simple „ProLeica“ adapter, the use of poles with Leica stud connection is also possible (s. page 51).

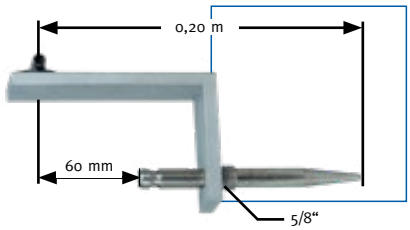
Prism pole for corner offsets



The pole is a modern, variable tool for tachymetric eccentric measurements of building points by means of a cross-excenter.

- Basic length of the cross offset: 0,20 m (Bild 1)
- Simple extension by screwing on a GFK/-CFK pole (Fig. 2)
- Target collimator for exact right-angled alignment of the pole to the tachymeter
- The prism can be rotated independently about its vertical axis on the L-carrier
- Use of commercially available prisms and reflectors

Prism pole „cross offset“



Consisting of: L-prism holder, target collimator, Leica stud bolt 40 mm, stainless steel tip, 5/8“ male thread for screwing on extensions.

When using prisms with Leica connection and original tilting axis height (86 mm) no further adapter is required.

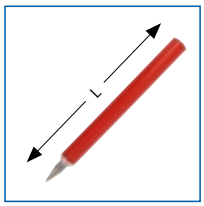
Description	Order-No.	Euro
Prism pole, „cross offste“ 0,20 m, with Leica stud bolt	**5800**	142,-

Pro-Leica-Adapter

For prisms/reflectors with 5/8" innter thread and 50 mm tilting axis height.

Description	Order-No.	Euro
Adapter Pro Leica – 5/8", for prisms with H = 50 mm	**0690**	50,-

INFO s. our prism series ONRT 50 **s. page 32**.



Extensions

GFK-/CFK-pole to extend the cross offset to 0,40 m or 0,50 m. With stainless steel tip. 5/8" inner thread to screw over the stainless steel spike of the 0,20 m prism pole No. 5800.

Description	Order-No.	Euro
Extension to 0,40 m for offset-pole, 5/8", L=292 mm	**5814**	47,-
Extension to 0,50 m for offset-pole, 5/8", L=392 mm	**5815**	53,-

Circular Level

Optional: Screw-on circular level for use as mini plummet bar with 0.20 or 0.40 m (or 0.50 m) prism/reflector height, incl. fixing screws

Description	Order-No.	Euro
Circular level, adjustable glass level, 25'	**1850**	36,-

Track and Rail Surveying

Page 1 of 1









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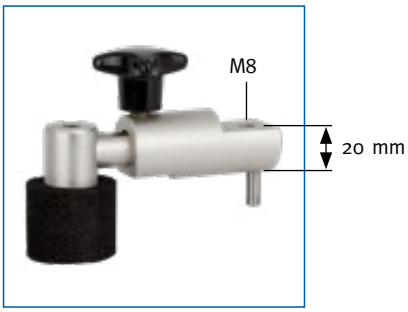
Track & Rail Surveying

Rail Angle SW PRO

Rail angle for exact measurement of the track position. The to be measured reference point P (running edge) is located on the inside of the rail, 14 mm below the rail top edge **RT** (running surface).
Exactly this point is realized by using the rail angle **SW PRO**.

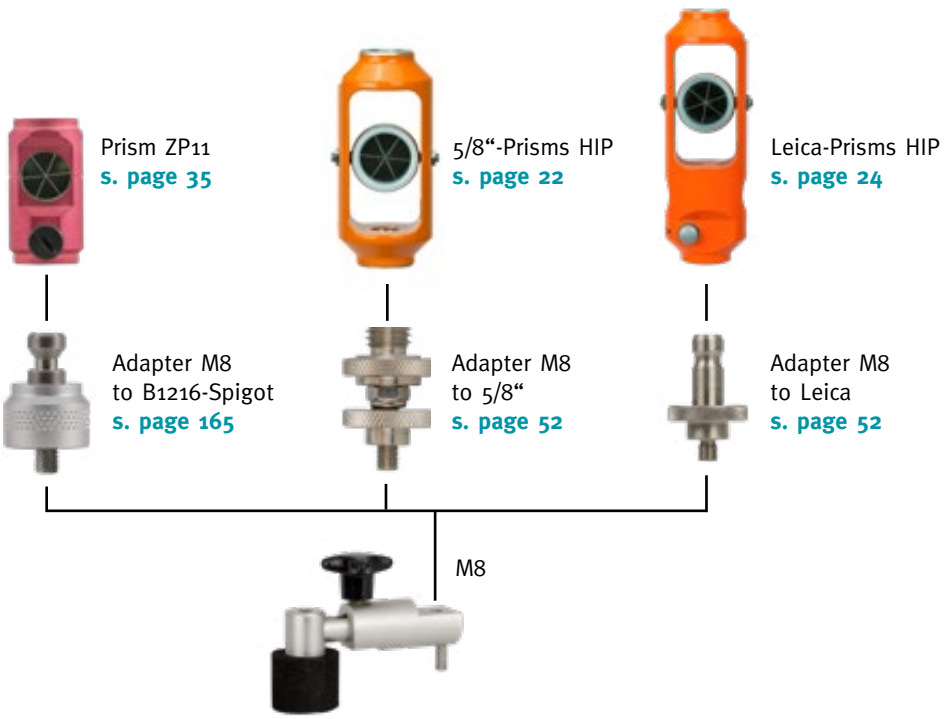
Design and Advantages

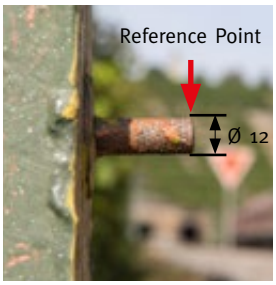
- Metal construction with hardened, 14 mm long cylindrical pin for precise contact to reference point P
- Cylindrical support of the SW PRO on the rail. This ensures vertical use at a constant distance from the UER even on tracks with a gradient
- Screw-in axis of the prism mount (M8 thread) is exactly above the reference point P
- Prism can be rotated around the prism axis and aligned with the total station, while the rail angle is fixed to the rail
- Adjustable foam rubber stop. After the track angle has been set up, it ensures that the cylindrical pin is always pressed against the reference point P with slight pressure. Adjustable for all rail widths, whereby the adjustment is to be made only once per rail shape. If a prism with extension upwards (e.g. prism pole) is used, the foam rubber stop ensures a safe and reliable contact of the rail angle at the reference point. The touchdown can be carried out upright, which is a great relief, especially with a large number of points to be measured. The slim cylindrical pin can be used to fix any markings attached to the side of the rail
- Setting the rail angle (including prism) perpendicular is done with the help of a circular level, which can be attached either to the prism holder or to the prism pole



Description	Order-No.	Euro
Rail Angle SW PRO (without M8-Adapter)	**0800**	112,-

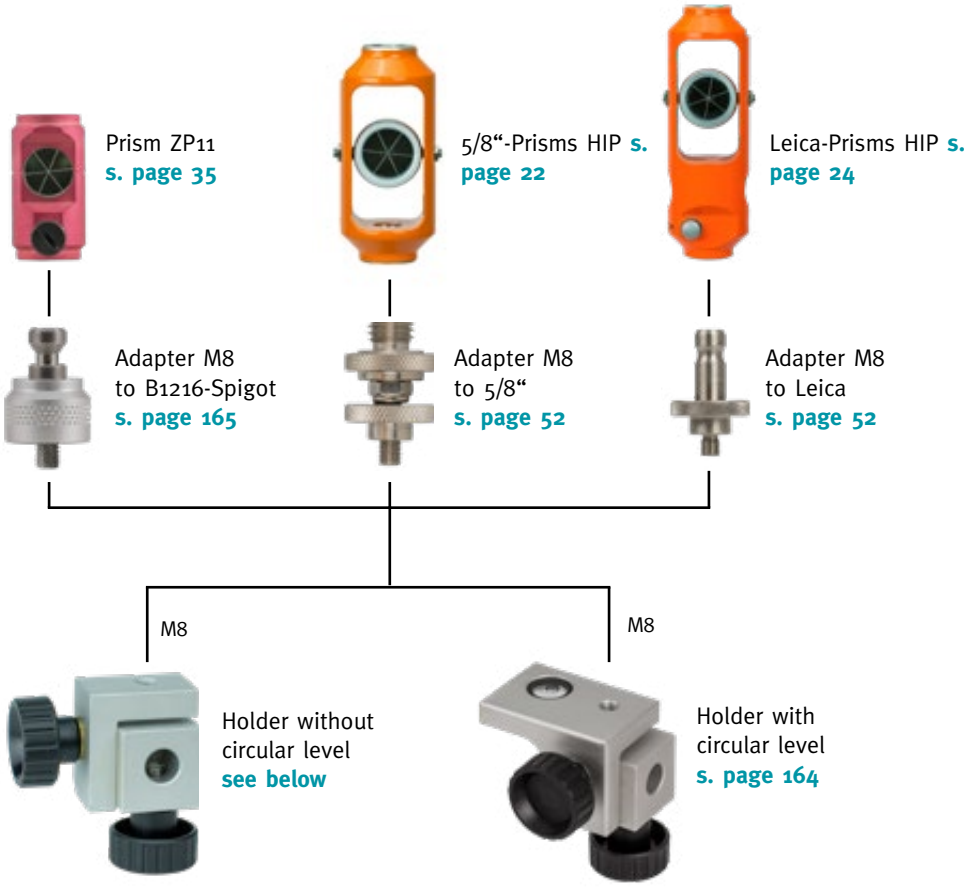
ON REQUEST Please enquire about rail angles for special widths (e.g. crane tracks).





Prism Holder for Surveying of Bolts

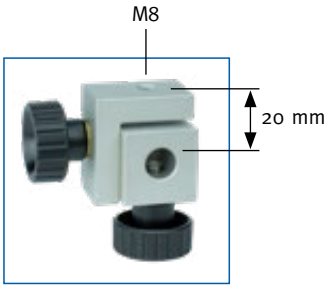
The holder can be used on all horizontal bolts (Ø 12 mm), which are common on catenaries made of steel or spun concrete .
The prism centre lies at an exactly determined distance above the reference point (see picture). The holder is available with or without built-in circular bubble. Then the plumb line is positioned using the circular bubble on the upper side of the prism.



Holder without circular level

After mounting the holder on the bolt, the prism is aligned to the tachymeter and positioned vertically. This position is fixed with the two knurled screws and then the measurement is carried out.

- Precisely machined metal construction made of anodised aluminium with ergonomic knurled screws
- Screwing axis of the prism mount (M8 thread) is exactly above the reference point (= center of front edge of bolt)
- With the corresponding M8 adapter, prisms with 5/8“ threads, Leica socket or the prism ZP11 can be used

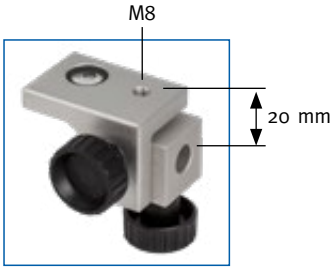


Description	Order-No.	Euro
Prism holder for horizontal bolts without level (without M8-Adapter)	**0850**	146,-

INFO When using the holder 0850, the prism must be equipped with a circular bubble. HIP series: s. page 50. Cylindrical Prism ZP11: s. page 35.

Holder with integrated Circular Level

For prisms and reflectors that are not equipped with a circular level. Ideally suited for use with regular and 360° prisms or for precision measurements with our ball prisms. The holder is adjusted perpendicularly by a built-in circular level.

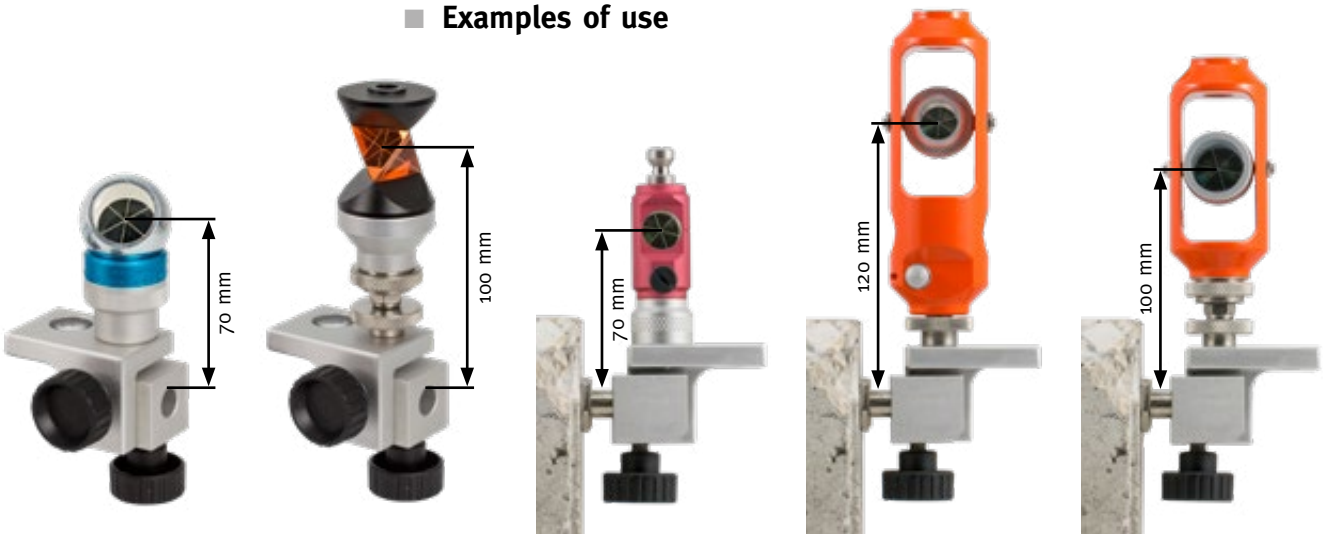


Holder with observation of the level from above or below

Especially with high bolts the observation of the circular level from below is an essential work facilitation, since no elaborate and dangerous climbing is necessary.

Description	Order-No.	Euro
Prism holder for horiz. bolts, with see-through circular level (without M8-Adapter)	**0852**	163,-

Examples of use



see page 226

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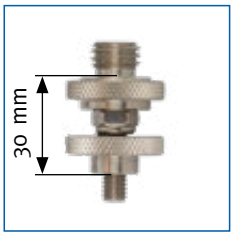
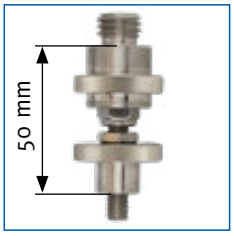
M8-Adapter for various Prisms

The following adapters can be used with the **rail angle SW PRO** as well as with the prism holder for **bolt marking**.

For prisms with 5/8" inner threads





When using prisms of our HIP series, tilting axis heights of 100 or 120 mm are obtained, each measured from the reference point.
For the SW PRO rail angle, this is the upper edge of the rail (UER = running surface), for the prism holder for bolt marking, the upper edge of the horizontal pin (reference point).

Tilting Axis Height 100 mm

more information s. page 52

Description	Order-No.	Euro
Adapter M8 – 5/8", L = 30 mm (wall adapter WA 30)	**0820**	43,-

Tilting Axis Height 120 mm

more information s. page 52

Description	Order-No.	Euro
Adapter M8 – 5/8", L = 50 mm (wall adapter WA 50)	**0810**	43,-

For prisms with Leica socket Ø 12 x 27 mm

Tilting Axis Height 120 mm

more information s. page 52

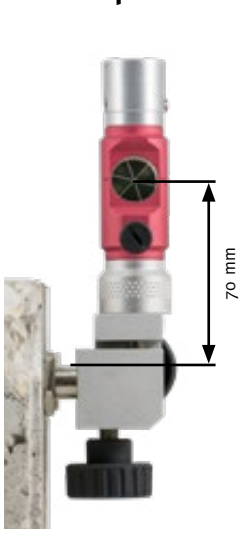
Description	Order-No.	Euro
Adapter M8 – Leica spigot St27 (wall adapter WA Leica)	**0830**	18,-

Für Zylinderprisma ZP11

Prism Center Height 70 mm

Description	Order-No.	Euro
Adapter M8 - B1216-Spigot	**6620.A**	26,-

Examples of use



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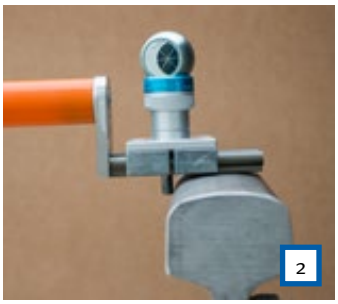

2

Track Gauge System TGS

Tachymetric determination of track gauges (950 to 1500 mm), superelevation and track axis.

With the newly developed **track gauge system TGS**, 2 prisms are positioned exactly above the running edges of the two rails. After tachymetric determination of the three-dimensional coordinates of the prism centers, the following information can be calculated program-controlled:

- **track gauge (width)**
- **lateral inclination (superelevation)**
- **track centre / axis**

If the tachymeter is stationed accordingly, the coordinates of the track axis can be used with country or project systems. More about that **s. page 167**

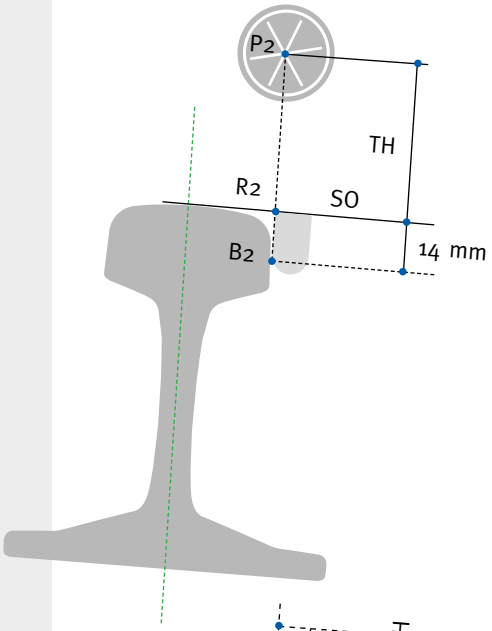
- Telescopic pole made of GFK and aluminium
- Quick adjustment of the pole (950 mm to 1500 mm) to the desired track width
- High stability with low weight
- Cylindrical outer pole made of 100% GFK:
  - Easy handling
  - **Electrically non-conductive**
  - Comfortable carrying even at low temperatures
- Measurement of the track gauge 14 mm below the rail top edge (RT), optionally convertible to 10 mm
- 1. Prism on the 1. rail: Fixed stop with double pin **[1]**
  - The large distance of 180 mm between the two stop bolts ensures safe right-angled alignment to the variable stop on the opposite side (2nd rail)
  - Distance between the two bolts can be shortened to 90 mm, e.g. for narrow curve radii for trams
- 2. prism on the 2. rail: movable slide **[2]**
  - A spring with 20 mm spring travel reliably presses the slide with the stop bolt against the reference point on the inside of the rail
  - Backlash-free slide bearing
- M8 thread for screwing on the two prisms / adapters
- Distance from RT (rail top edge) to screw-in surface of the M8 thread: 30 ±0,1 mm
- Approx. 35 mm clear height from RT to underside telescopic pole. Extendable to a clear height of 85 mm (**s. page 170**)
- Weight: 2,0 kg (without prisms)

Description	Order-No.	Euro
Tachymetric Track Gauge System TGS, for track gauges of 950 to 1500 mm	**0802**	1.260,-

NOTE The track gauge system can be converted to measure running edges 10 mm below the top edge of the rail (instead of 14 mm). Please inquire.



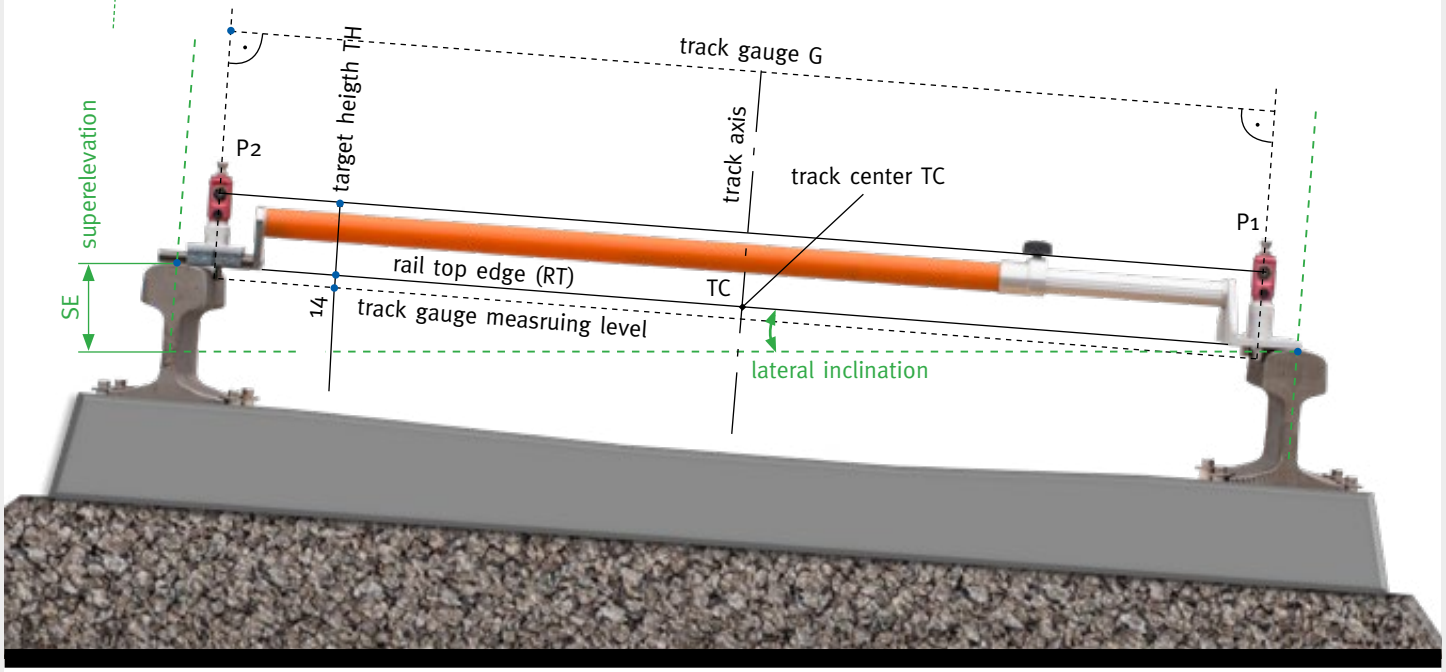




Track surveying with the tachymeter

With precision total stations, measurements in the differential range can be carried out with an accuracy in the submillimeter range.
In order to achieve this also for the indication of **track gauge**, lateral inclination (**superelevation**) and **track centre** (track axis), the exact reference to the relevant points must be given and the measurement must be carried out with precision reflectors.

With the TGS track gauge system, the 3-D coordinates of the two reference points R1 and R2 located on the top edges of the rails RT can be determined with high precision and the desired data calculated from them.



The basis of the track measurement is the definition of the track gauge within the relevant regulations.

INFO

The track gauge of the track is the distance between the running edges of the rails and **in Germany** is measured 14 mm below the connecting line of the highest points of the two rails (rail top edge = RT).

The **track gauge G** is thus the distance between the two **reference points B1 and B2,** which lie opposite each other on the inside of the two rails.
The track gauge system is designed in such a way that the prism centres P1 and P2 lie on a parallel with a defined distance to the connecting line of points B1 and B2, in each case at an exact right angle to these.
After placing the pole at the inner rail edges, the two **prism centres P1 and P2** are measured tachymetrically. From their 3D coordinates, taking into account the target height TH, The **reference points R1 and R2** can be calculated, and from this, independent of the coordinate system, the actual **track gauge** and the **superelevation SE**.
If the tachymeter is stationed accordingly, the coordinates of the **track centre TC** in the desired system are additionally obtained by averaging the points R1 and R2.

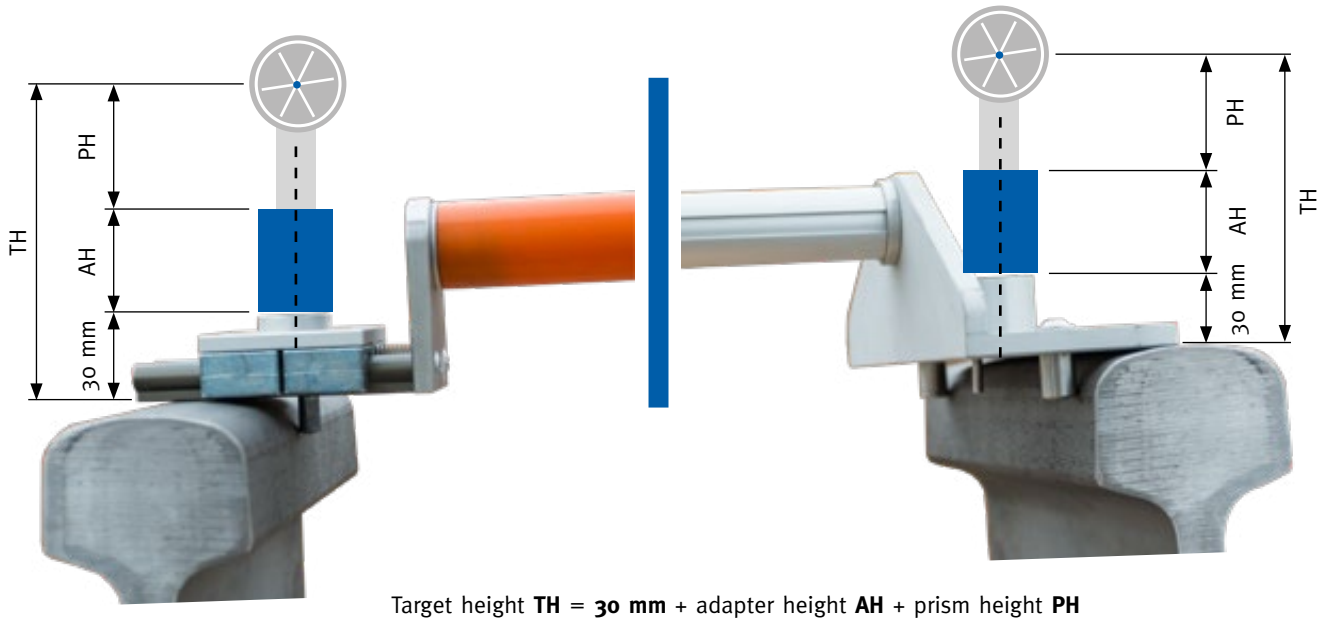
The only requirement is software that can calculate the relatively simple geometric correlations.

M8 adapter for track gauge system for prisms and targets

The accuracy of the track measurement depends on the one hand on the tachymeter used and the stationing and on the other hand on the exact mapping of the track geometry by the track gauge system. The third essential factor is the reflectors used. The track gauge system TGS has an M8 internal thread on both sides. So almost all commercially available prisms can be used with appropriate adapters.
For precision measurements, however, high-quality prisms or prism holders should be used. It is very important that the visible prism centre (centrally symmetrical point) runs through the vertical axis of the support. In addition, the necessary stability must be taken into account; the best results are obtained with metal mounts and supports. It goes without saying that the prism constants must be clearly indicated. It is recommended to use the same prism type on both sides of the TGS, with identical constants checked by comparison measurements.

Our ball prism series and the ZP11 cylinder prism meet all these requirements. In addition, they have a very low overall height, which also increases accuracy.

Determination of the target height TH above rail top edge RT:



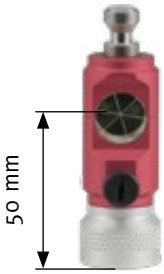
Target height **TH** = **30 mm** + adapter height **AH** + prism height **PH**

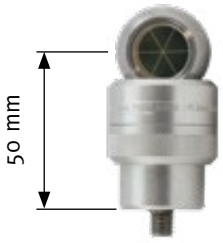
Adapter and prisms for track gauge system TGS

Adapter M8a – Spigot B1216 s. page 165

AH = 20 mm / TH = 80 mm

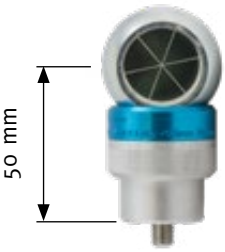
For Cylinder prism ZP11





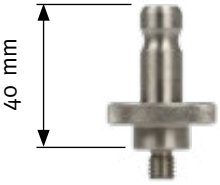
Base with M8 thread for ball-Ø30 mm s. page 76

AH + PH = 50 mm / TH = 80 mm



Base with M8 thread for ball-Ø1.5“ s. page 76

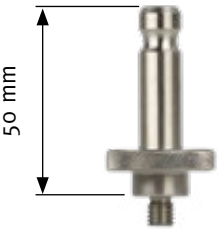
AH + PH = 50 mm / TH = 80 mm



Adapter WA Leica s. page 52

AH = 40 mm / TH = 130 mm (when using Leica-prisms)

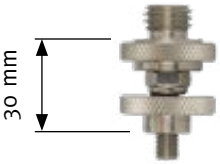
For prisms with Leica bolt socket



Adapter WA Leica 40 s. page 169

AH = 50 mm

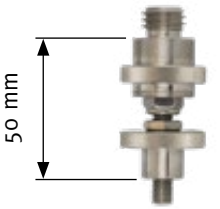
To use with prism **Leica GPR 121**



Adapter WA 30 s. page 52

AH = 30 mm

For prisms with 5/8“ inner threads
Examples: Bohnenstingl prism series HIP, ONRT, Zeiss KTR1



Adapter WA 50 s. page 52

AH = 50 mm

For prisms with 5/8“ inner threads
Examples: Bohnenstingl prism series HIP, ONRT, Zeiss KTR1

M8 centering plates s. page 100

AH = 3 mm

e.g. for ball prisms with magnetic bases (s. page 75)

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Tracks with obstructions between the rails

Track systems, especially in inner-city areas, often have installations between the rails which protrude above the upper edge of the rail (SO). The standard version of the TGS track gauge system can be used for obstacles up to a height of 40 mm above RT. For higher superstructures, the bases of the rail supports can be increased so that a clearance height of 85 mm above RT (rail top edge) is available.

A set for upgrading the TGS consists of three support extensions: Two for the side with the fixed stop and one for the side with the movable slide.

Support extension for fixed stop

- For insertion into bores at the double stop
- Fixation with M6 Allen screw (SW 4)
- Exact axial extension of the standard bolt Ø12 mm
- Bolt length 14 mm for stop at reference point
- Distance from TR to screw-in surface of the M8 thread for prism / adapter: 80 ±0,1 mm
- Clearance height from RT to underside of telescopic pole: approx. 85 mm
- Weight: 140 g

Description	Order-No.	Euro
Support extension 50 mm for fixed stop, 1 piece	**0803.D**	74,-

(2 pieces are required)

Support extension for movable slide

- To attach to the stop bolt of the slide
- Fasten with M6 Allen screw (SW 4). Key supplied
- Exact axial extension of the bolt Ø8 mm
- Bolt length 14 mm for stop at reference point
- Distance from TR to screw-in surface of the M8 thread for prism / adapter: 80 ±0,1 mm
- Clearance height from RT to underside of telescopic pole: approx. 85 mm
- Weight: 140 g

Description	Order-No.	Euro
Support extension 50 mm for movable slide	**0803.E**	89,-

NOTE The support extensions are also available with bolts for measuring running edges 10 mm below the upper edge of the rail. Please inquire.

Transport case for TGS

Safe protection of the track gauge system during transport.
Adapters, prisms and any support extensions can also be accommodated, but must be removed from the TGS before closing the case.

- Robust hard shell case with bubble foam in base and lid
- Outer dimensions LxWxH: approx. 118 x 29 x 12 cm
- 4 snap locks
- Weight: 4,7 kg

Description	Order-No.	Euro
Transport case for TGS	**0802.K**	100,-


Panasonic **FZ-G2**


Trimble **T10**


Trimble **T7**


Panasonic **FZ-G1**


Trimble **TSC7**


Trimble **T100**


Panasonic **FZ-M1**


Leica **CS35**


Leica **CS10/15/20**


Panasonic **CF-20**


Getac **F110**


Microsoft **Surface Book 2**


Panasonic **FZ-A3**


Getac **T800**


Panasonic **CF-33**


Getac **UX10**

Holder for Tablets & other devices

- Mounting options to pole or tripod
- Can be used with carrying systems (mobile)
- Efficient switching between different applications
- Protection of the computer by protruding holder

Holders specifically for certain computers

For computers frequently used in surveying, we offer custom holders designed specifically for use with the computer in question.

Panasonic

- Panasonic **FZ-G1**: page 174
- Panasonic **FZ-G2**: page 173
- Panasonic **FZ-M1**: page 176
- Panasonic **CF-20**: page 177
- Panasonic **FZ-A3**: page 183
- Panasonic **CF-33**: page 179

Getac

- Getac **T800**: page 180
- Getac **F110**: page 181
- Getac **UX10**: page 182

Trimble

- Trimble **T10**: page 175
- Trimble **TSC7**: page 189
- Trimble **T00**: page 189
- Trimble **T7**: page 189

Leica

- Leica **CS35**: page 174
- Leica **CS 10/15/20**: page 187

Microsoft

- **Surface Book 2**: Seite 180


Tablet-holders


Laptop-holders

Universal Holder System (ALOVAR)

Due to the large market diversity, we cannot offer a special computer holder for every type of computer. Our universal holders in different sizes, however, make it possible to accommodate almost any computer safely in a holder.

s. page 184

Smartphone Holder

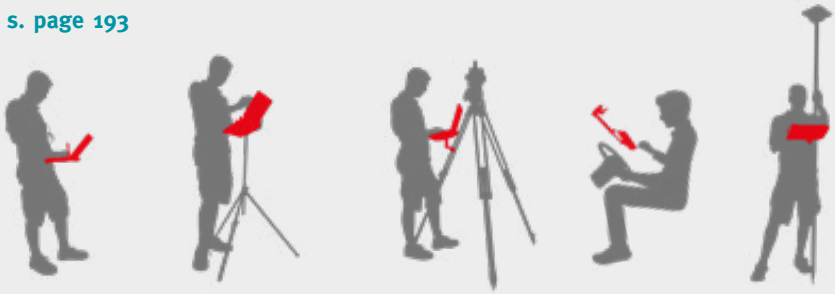
Increasingly powerful smartphones are also becoming more and more relevant. The X-Grip mounts are fast, secure and can be used with our other accessories.

s. page 192

Accessories

Can be easily combined with our computer holders: Pole clamps, mobile carrying systems, adapters, tripods, connecting arms, ball heads, etc.

s. page 193



Holder for Panasonic FZ-G2

The FZ-G2 is inserted into the holder and fixed stably in seconds with a rotary lever and secured against falling out (see pictures below). Upside-down transport is also possible. All interfaces remain freely accessible, only the contact strip for the docking station is covered.

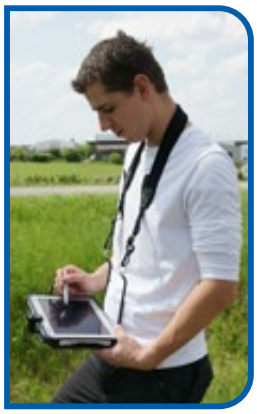
- Black powder coated light metal shell
- Usable with **all battery types**, handstrap not usable
- **Not yet** confirmed: Use with Trimble- and Leicafunk
- Use of camera function always possible
- Holes to attach a RAM 1“ or 1.5“ ball
- Weight: 475 g

Description	Order-No.	Euro
Holder for Panasonic FZ-G2, with thread connections: **M8, 3/8"**	**5849**	184,-

INFO If you want to use the optional keyboard, the holder no. 5849 cannot be used. Instead, you can use the holder No. 5870.CF20 instead (only for exclusive use as a laptop).

Mobile

with carry easy mobile system
page 206

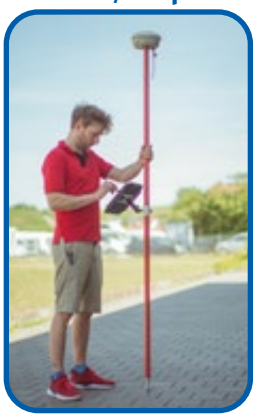


With holding brackets
page 204

Vehicle

Car mount
page 211

Pole / Tripod



Pole clamp
page 194

Light Tripod

Easy Going tripod
page 200

Clamping Lever

Nach dem Einlegen wird der Rechner mit einem Klemmhebel fixiert.

RAM-Connection

Retrofit RAM ball: page 214

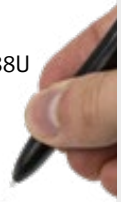
Pen holder

Pen holder: page 213

Computer Mount: Panasonic FZ-G1 / Leica CS35

The FZ-G1/CS35 is inserted into the holder and can be fixed into it in a matter of seconds by using a rotary lever. It is then stable and secured against falling out. Transportation upside down is now also possible. All interfaces remain freely accessible, only the contact strip for the docking station will be covered.

- Black powder-coated light metal shell
- Can be used with the flat battery FZ-VZSU84U and the bigger battery FZ-VZSU88U
- Can be used with integrated Trimble- and Leica radios
- Use of the camera function always possible (cut-out is provided)
- Handstrap not usable
- Weight: 475 g



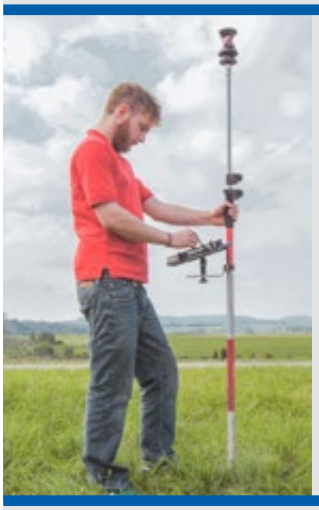
optional pen holder,
s. page 213

Description	Order-No.	Euro
Holder for Panasonic Fz-G1 / Leica CS35, threads **M8, 3/8"**	**5846**	184,-
Holder for Panasonic Fz-G1 / Leica CS35, with **RAM-1"-ball-mount**	**5846.R**	184,-

Light Tripod

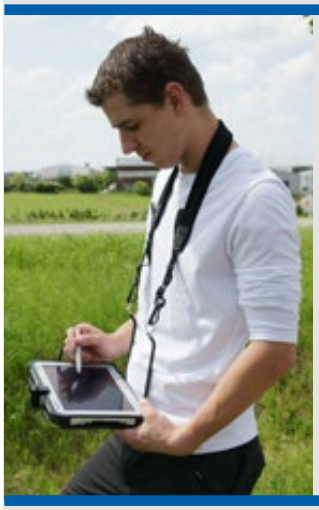
Easy Going Tripod
page 200

On poles or a tripod

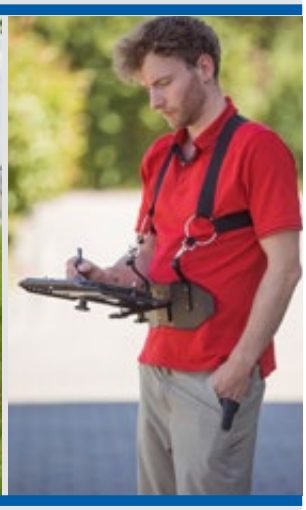


Pole mount
page 194

Mobile



With holding brackets
page 204



With Carry Easy System
page 206

In Vehicle

Car mount
page 211

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Computer Mount for Trimble T10

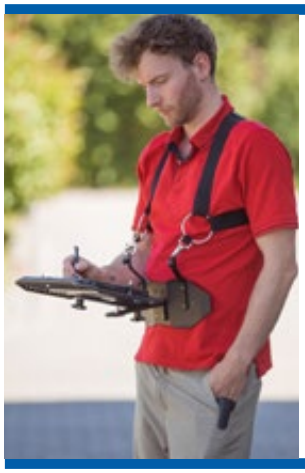
The Trimble T10 is inserted on the holder and can be fixed to it in a matter of seconds by using a rotary lever. It is then stable and secured against falling out. Transportation upside down is now also possible. All interfaces remain freely accessible, only the contact strip for the docking station will be covered.

- Black powder-coated light metal shell
- Use of the camera function always possible (cut-out is provided)
- **Handstrap is usable**
- Weight: 475 g

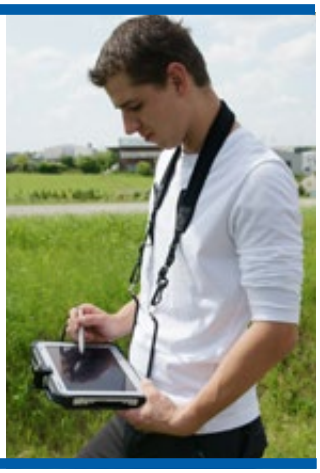
optional pen holder,
s. page 213

Description	Order-No.	Euro
Computer holder for Trimble T10 with threads **M8, 3/8"**	**5846**	184,-

Mobile

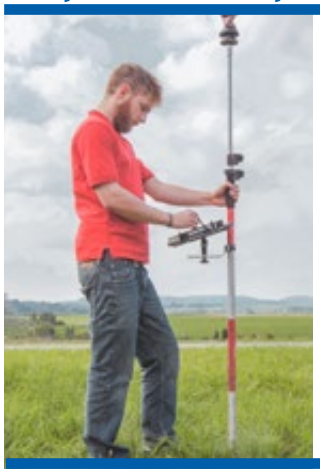


With Carry Easy System
page 206



With holding brackets
page 204

On poles or a tripod



Pole mounts
page 194

Light Tripod

Easy Going Tripod
page 200

Vehicle

Car suction holder
page 211

RAM-Ball

Retrofitting RAM-ball,
page 214

Note: The pictures below show the Panasonic FZ-G1. An application with the Trimble T10 would be comparable. The same accessories can be used.

Computer mount for Panasonic FZ-M1

The FZ-M1 is slipped into the holder from above and fixed in place and secured against falling out by an integrated pressure point. Even transportation upside down is possible. All relevant interfaces remain freely accessible.

- Black powder-coated perforated aluminium sheet with stable edge protection
- Two guide rails give the computer a secure hold
- Bottom-mounted RAM 1" ball for versatile applications
- Can be used with all available battery types

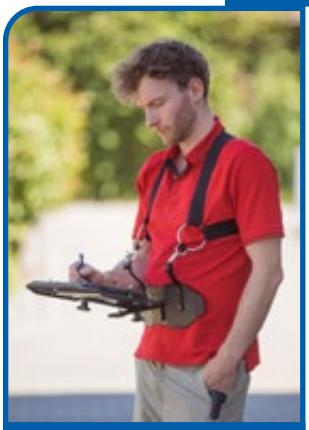
Underside

Description	Order-No.	Euro
Computer holder for Panasonic FZ-M1, with **RAM-Connection**	**5870.M1.R**	137,-

Integrated pen holder

For transport, the pen can also be deposited lengthwise in the guide.

Mobile



Carry Easy System

page 206

eyelets & neck strap

page 203

Light tripod

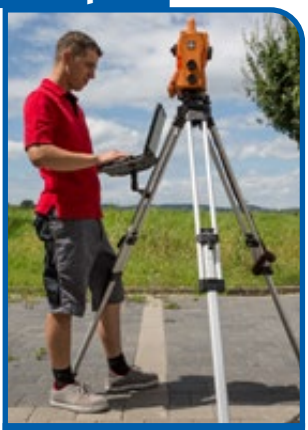
Easy Going tripod

page 200

On pole or tripod

Pole mount

page 194



In Vehicle

Car suction holder

page 211

Picture shows FZ-G1. However, the application is comparable.


1


2


3


4

Mount for Panasonic Thoughbook CF-20

The Panasonic field computer can be used in 3 different variants:

- As a classic Laptop (Fig. 1)
- As a Tablet, using only the separated display-part (Fig. 2)
- As a Tablet, with the keyboard-party flipped below the display-part (Fig. 3)

Two clamping levers and two positioning pins fix the computer securely on the holder and allow it to be transported upside down. All relevant interfaces remain freely accessible. When using the display on the keyboard, the CF-20 and its holder can be carried like a bag with the handle integrated in the computer housing (Fig. 4).

Features

- Holds computer in all its variants
- Black powder-coated aluminium perforated plate
- Stable edge protection
- Cut-out for integrated camera
- Two clamping levers and two positioning pins to secure computer
- Weight: 520 g


Threads M8, 3/8"

Adapting the holder to the variants

To be able to use the CF-20 both with the lower part of the keyboard and only with the display, the holder has two variable positioning pins and a clamping lever.

Using the CF-20 with the keyboard

- Place disc with positioning pins backwards (Fig. 1)
- Rotate the clamping lever with the **side without orange marking** (Fig. 2) over the keyboard-housing

5


6


Using only the display-part as a tablet

- Turn disc with the pins towards the front until they stop at the computer housing (Fig. 3)
- Turn clamping lever **with orange marking** (Fig. 4) over the display-housing

7

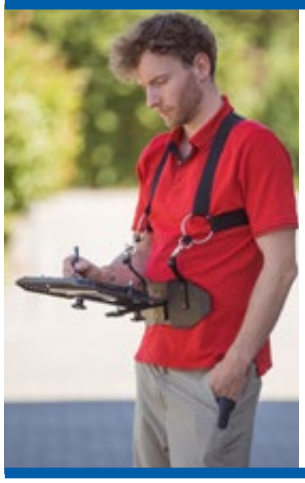

8


Description	Order-No.	Euro
Holder for Panasonic CF-20, with threads **M8, 3/8"**	**5870.CF20**	158,-

more accessories on the **next page 178**

Accessories for Panasonic CF-20

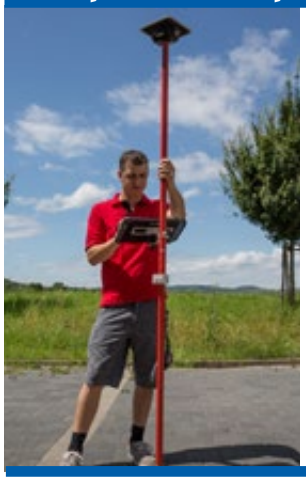
Mobile



With Carry Easy system
page 206

With holding brackets
page 204

On pole or tripod



Pole mount
page 194

Light Tripod

Easy Going tripod
page 200

Vehicle

car suction holder
page 211
Image shows FZ-G1. Application, however, is comparable.

Pen holder

Pen holder
page 213

RAM-Ball

Retrofitting RAM-ball,
page 214

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Holder for Panasonic CF-33

The CF33 is inserted into the holder and fixed in place in seconds with **two clamping levers** and secured against falling out. A total of 4 clamping levers are attached. Two for securing the CF-33 as a tablet and the other two for securing the CF-33 as a laptop (attached diagonally).

Upside-down transport is also possible.
All relevant interfaces remain freely accessible.

- Black powder coated aluminum perforated plate
- Stable edge protection
- Connection options: M8, 3/8“
- 4 clamping levers for use of the CF33 in tablet or laptop function
- Holes for screwing on a 1.5“ RAM ball

Description	Order-No.	Euro
Holder for Panasonic CF33, with threads **M8, 3/8"**	**5870.CF33**	160,-

Mobile

With Carrying System „Carry Easy“
page 206

4-point-cord-adapter
page 205

Pole / Tripod

Pole mounts
page 194

Light Tripod

Easy Going Tripod
page 200

Vehicle

Car mounts
page 211
Picture shows FZ-G1.
Application comparable.

Clamping lever and adjustable positioning pin

A total of four clamping levers. Two diagonal ones each secure the CF-33 as a tablet and a laptop, respectively.

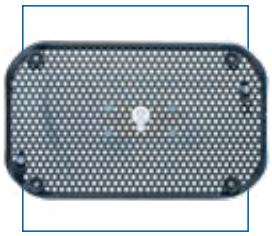
A variable positioning pin secures either tablet or laptop against slipping:

RAM 1.5“ ball

Retrofitting RAM-1.5“ ball:
page 214

Pen Holder

Pen Holder: page 213



Computer Mount for Getac T8oo

The T8oo is placed on four rubberized support points. Due to the shape of its housing the computer does not slip around on them. With two clamping levers, which can be rotated onto the display-casing, the computer is secured against falling out. Thefore a transportation upside-down is also possible. All relevant interfaces remain freely accessible.

- Black powder-coated aluminium perforated plate
- Sturdy edge protection
- Two lockable clamping levers give computer a secure hold
- The T8oo can be used with or without snapback.

Description	Order-No.	Euro
Holder for Getac T8oo, with threads **3/8", M8**	**5870.T8**	116,-

pen holder, page 213

Mobile

eyelets & neck strap
page 203

On pole or tripod

pole mount
page 194

Light tripod

Easy Going tripod
page 200

Vehicle

car suction holder
page 211
Image shows FZ-G1. Application, however, is comparable.

RAM-Ball

Retrofitting RAM-ball,
page 214

Computer Mount for Getac F110

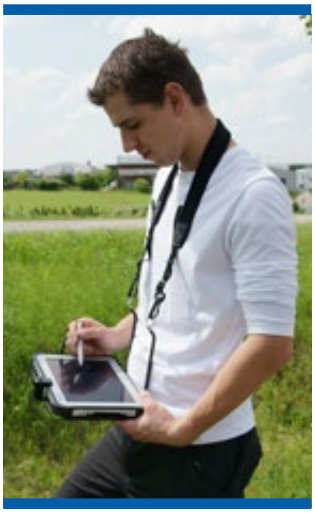
The F110 is put onto the holder and can be locked in place with two clamping levers in a matter of seconds. It is then fixed in a stable way and secured against falling out. Transportation upside down is also possible.
All interfaces remain freely accessible.

- Black powder-coated aluminium perforated plate
- Sturdy edge protection
- Two clamping levers give computer a secure hold

Description	Order-No.	Euro
Computer holder for Getac F110, with threads M8, 3/8"	**5870.F110**	160,-

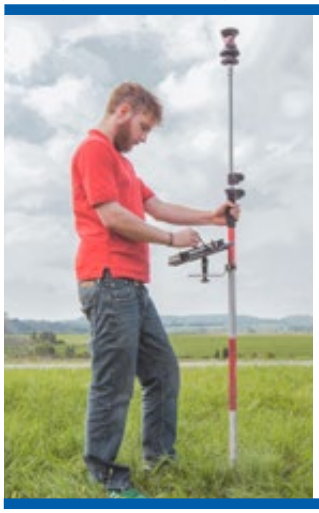
pen holder, page 213

Mobile



With holding brackets
page 204

On pole or tripod



pole mount
page 194

Light Tripod

Easy Going tripod
page 200

Vehicle

car suction holder
page 211
Image shows FZ-G1. Application, however, is comparable.

RAM-Ball

Retrofitting RAM-ball,
page 214

Holder for Getax UX10

The UX10 is inserted into the holder and is clamped with two levers within seconds Stably fixed and secured against falling out. Even a transport upside down is possible. All interfaces remain freely accessible.

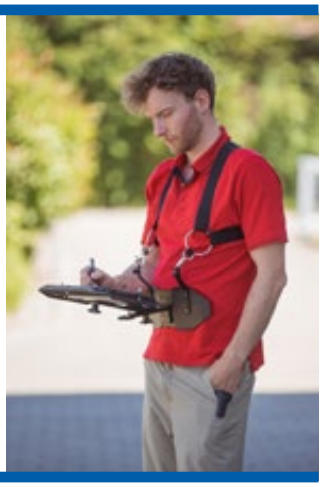
- Black powder-coated perforated aluminum sheet
- Stable edge protection
- Two lockable clamps give computer a secure hold
- Three positioning pins secure the computer from slipping
- Milled base plate with internal thread M8 and 3/8"
- **All battery types can be used with this holder!**
- Rear camera is covered by holder plate (can not be used)
- Weight: 525 g

Description	Order-No.	Euro
Holder for Getac UX10, with threads M8, 3/8"	**5870.UX10**	160,-

Mobile

With support brackets
page 204

Ring eyelets & neck strap
page 203

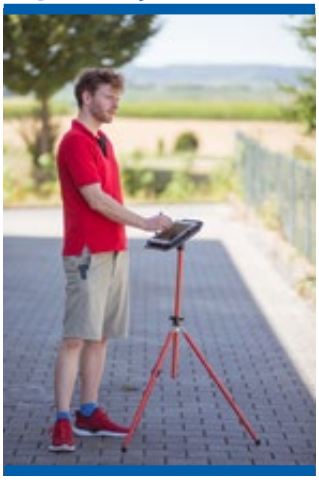


Carry Easy „Fold“
page 206

Pen Holder

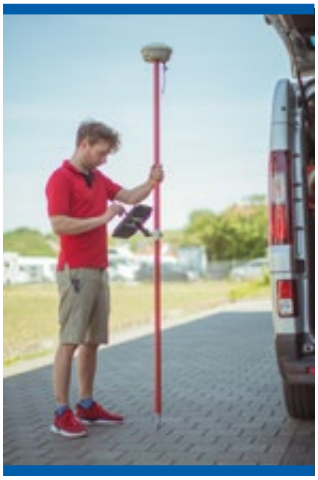
Pen Holder
page 213

Light Tripod



Easy Going Tripod,
page 200

On GNSS-Pole



Pole Holder,
page 194

In Vehicles

Car Holder
page 211

RAM-Connection

Retrofitting RAM 1" ball
page 214

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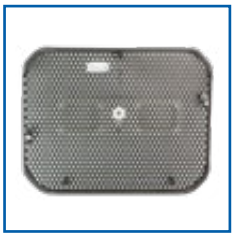


Holder for Panasonic FZ-A3

The A3 is inserted into the holder and is clamped with two levers within seconds Stably fixed and secured against falling out. Even a transport upside down is possible. All interfaces remain freely accessible.

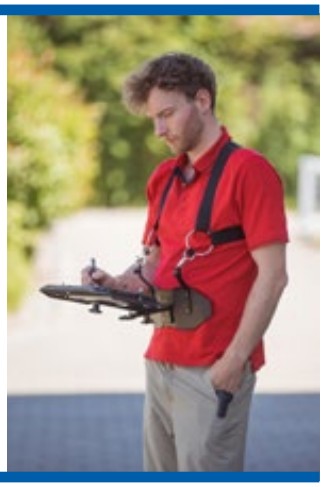
- Black powder-coated perforated aluminum sheet
- Stable edge protection
- Two lockable clamps give computer a secure hold
- Three positioning pins secure the computer from slipping
- Milled base plate with internal thread M8 and 3/8"
- **Attention**: Mounting **only** possible for use with flat standard battery!
- Weight: 470 g

Description	Order-No.	Euro
Holder for Panasonic FZ-A3, with threads M8, 3/8"	**5870.A3**	160,-

Mobile

With support brackets
page 204

Ring eyelets & neck strap
page 203

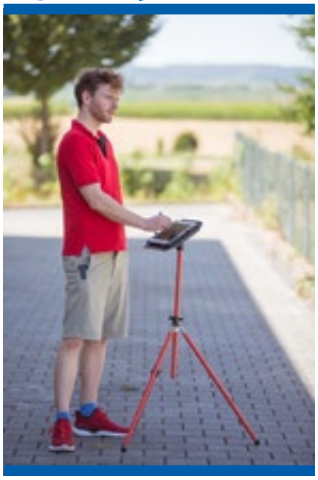


Carry Easy „Fold“
page 206

Pen Holder

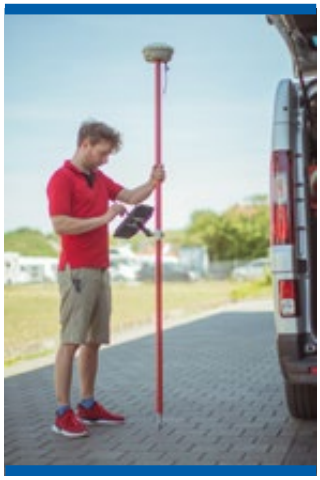
Pen Holder
page 213

Light Tripod



Easy Going Tripod,
page 200

On GNSS-Pole



Pole Holder,
page 194

In Vehicles

Car Holder
page 211

RAM-Connection

Retrofitting RAM 1" ball
page 214

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Universal Holder ALOVAR

Small computers, laptops and tablets are also increasingly used in surveying. The standard mounts available for this purpose often do not meet the rough conditions of use in surveying.
Our ALOVAR series, specially designed for outdoor use, are stable and allow universal use with tripods, poles and carrying systems.

- High-quality holder made of aluminum: Stable and lightweight (powder-coated)
- The tablet computer is protected in the holding tray
- Stable edge protection
- Variable application possibilities due to threads or RAM connection options
- Adjustable clamping levers allow quick locking and guarantee secure hold (sold separately). See below.

ALOVAR **Base plates** see page 185

Adjustable clamping levers

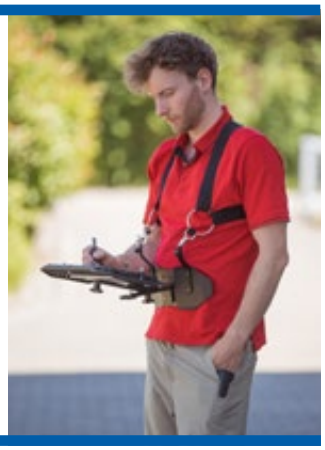
With (at least) two clamping levers, the computer is stably fixed in seconds and secured against falling out.
- Transport upside down is possible
- All interfaces remain freely accessible
- By repositioning plastic distance pieces the clamping levers can be adjusted for any height in 1-mm increments up to the max. height of the order number

Clamping levers see page 185

Mobile

With support brackets
page 204

Ring eyelets & neck strap
page 203



Carry Easy „Fold“
page 206

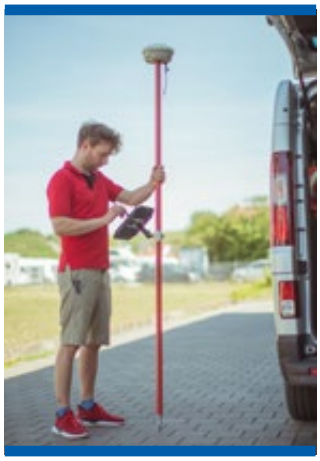
Pen Holder

Pen Holder
page 213

Light Tripod

Easy Going Tripod,
page 200

On GNSS-Pole



Pole Holder,
page 195

In Vehicles

Car Holder
page 211

RAM-Connection

Retrofitting RAM 1" ball
page 214

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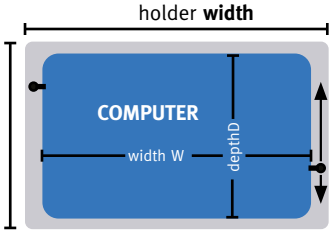
underside

underside (S1 & S2)

Determine suitable base plate for your computer



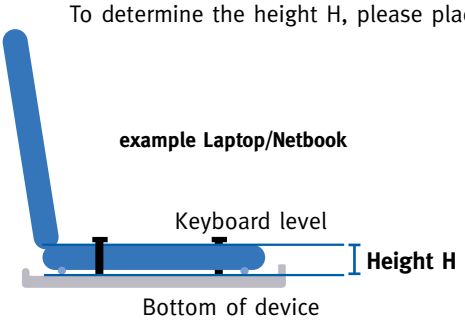
The position of the clamping levers can be freely selected on the perforated plate so that all important inputs remain accessible.

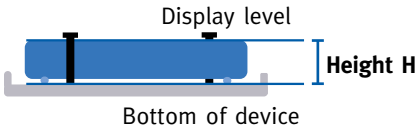
The adapter plate offers connection options for M8 and 3/8“ threads.

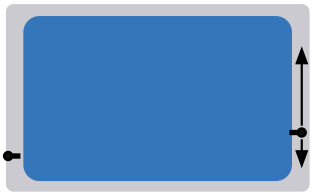
	for comp. up to max.		holder ALOVAR				
Type	width W	depth D	width	depth	weight	**Order-No.**	Euro
S2	242 mm	144 mm	285 mm	175 mm	315 g	**5870.S2**	100,-
S1	250 mm	190 mm	290 mm	215 mm	390 g	**5870.S1**	100,-
270	270 mm	220 mm	300 mm	230 mm	560 g	**5870.270**	116,-
320	320 mm	255 mm	350 mm	265 mm	660 g	**5870.320**	131,-
370	370 mm	280 mm	400 mm	300 mm	760 g	**5870.370**	147,-
420	420 mm	310 mm	450 mm	330 mm	875 g	**5870.420**	163,-

Determine suitable clamping levers for your computer

The computer is clamped at keyboard level for laptops or at display level for touchbooks/pads. By simply repositioning plastic sleeves, the clamping levers can be adjusted for any height in 1 mm increments up to the max. height of the order number. To determine the height H, please place the calculator on a flat surface.







The position of the clamping levers can be freely selected on the perforated plate so that all important inputs remain accessible.

Description	**Order-No.**	Euro
Clamping lever up to max. **17 mm**, 1 piece	**5870.K0**	9,50
Clamping lever up to max. **27 mm**, 1 piece	**5870.K1**	9,50
Clamping lever up to max. **37 mm**, 1 piece	**5870.K2**	9,50
Clamping lever up to max. **47 mm**, 1 piece	**5870.K3**	9,50
Clamping lever up to max. **57 mm**, 1 piece	**5870.K4**	9,50

INFO

To securely fix the computer to the holder, you will need **at least two clamping levers**. The installation of the clamping levers is explained in detail in the instructions supplied.
Positioning pins can also be very helpful (see page 213).

Holder for Microsoft Surface Book 2

The Surface Book 2 is inserted into the holder and fixed stably in seconds with **two clamping levers** and secured against falling out. The left clamping lever can be used to fix the Surface Book 2 as a laptop and as a tablet. The right clamping lever has two different noses with different clamping heights. One clamping height is intended for clamping device as a laptop and one for clamping the device as a tablet.

All relevant interfaces remain freely accessible.

- Black powder coated aluminum perforated plate
- Stable edge protection
- Connection options: M8, 3/8“
- Threads for attaching a 1.5“ RAM ball
- Clamp lever **for use of Surface Book 2 in tablet or laptop** function

Description	Order-No.	Euro
Holder for Microsoft Surface Book 2, with threads **M8, 3/8"**	**5877.MS01**	163,-

Mobile

With Carry Easy mobile system
page 206

With 4-point Cord belt adapter
page 205

Light Tripod

Easy Going tripod
page 200

Clamping lever, positioning pins & camera cut-out

Clamping levers on the right and left of the laptop/tablet Secure the device against from falling out and slipping. Two stop pins provide additional support.

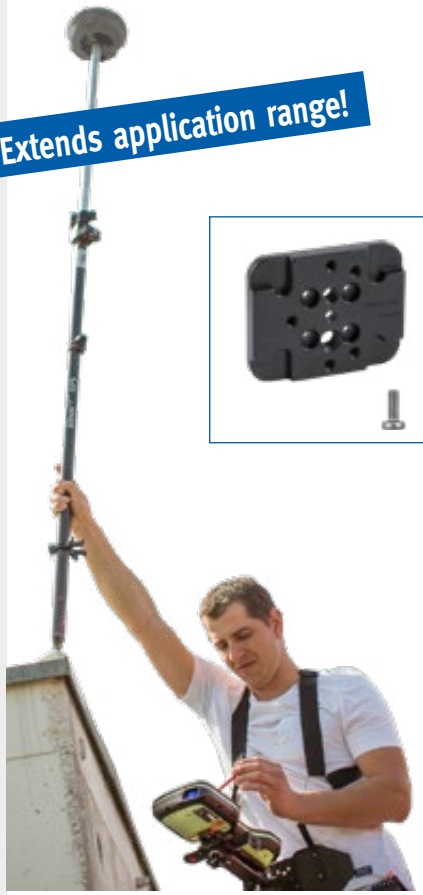
Two additional positioning pins fix the device at the rear.
A cut-out allows taking pictures when the tablet is inserted into the cradle.

RAM 1.5“ ball

Retrofit RAM-1.5“ ball,
page 214

Pen Holder

Pen holder, page 213



Adapter plate: Leica-Controller Nova CS10, 15, 20

For use of the controller with other accessories e.g. carrying holder, tripod etc.

There are two ways to screw on the adapter plate.
Instructions on the next page, page 188.

- Aluminium, black anodized
- Weight: 100 g

Description	Order-No.	Euro
Adapter plate for Leica Viva CS10, CS15, CS20 incl. fixing screw	**5272**	86,-

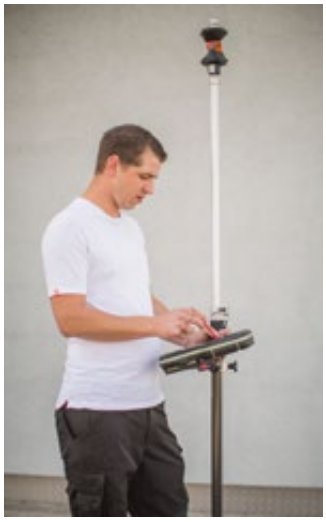
Examples of use

Lightweight tripod „Easy Going“

page 200

For longer use in the same measuring range, the controller does not always have to be worn on the body. It can be operated very easily on the lightweight stand, leaving your hands free.

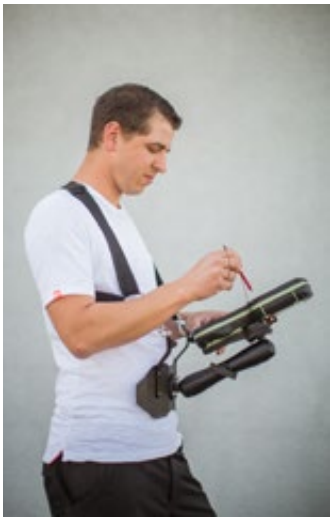
On GNSS-/ prism pole



page 194

With the adapter plate, you can also use our established Bohnenstingl pole clamps, as an alternative to the Leica pole clamp.

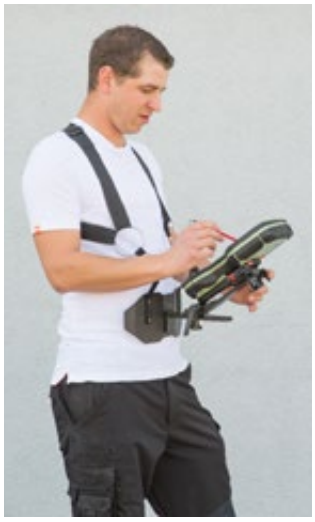
Mobile use with „Carry Easy RAM“



page 209

The belly support is equipped with a RAM 1.5" ball. A 1.5" ball is also screwed to the adapter plate.
With the RAM double joints a universal adjustment of the controller is possible.

Mobile use with „Carry Easy Fold“



page 206

The **„carry easy Fold“** holder has a hinge attached to the belly support. This allows for optimal adjustment and folding of the computer.

Instructions for adapter plate: Leica-Controller

The adapter plate is suitable for mounting the following controllers:

- **Leica GHT62** for Nova CS 10 and 15
- **Leica GHT66** for Nova CS 20

The 2 possibilities of installation:

(pictures show the assembly for the GHT66, for the GHT62 it is done the same way)

Screw directly onto the controller holder GHT62 or GHT66

Loosen the M4 star grip screw and remove the crossbar for pole connection

Screw on the adapter plate with enclosed flat head screw M4x16 mm

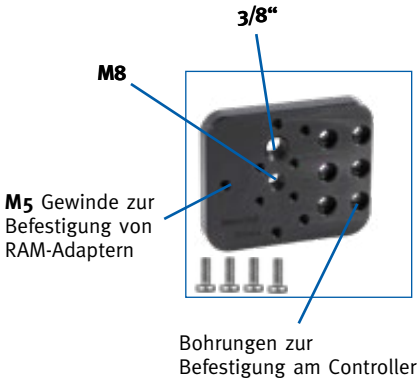
Screw onto the crossbar for pole connection

If, in addition to the applications with the adapter plate, parallel use of the original Leica pole clamp is to remain possible, the crosshead must not be removed. However, the crosshead must then be provided by us with 4 threaded holes for screwing on the adapter plate. This does not affect the function and stability.

Screw on the traverse with the enclosed flat head screw M4x16 mm instead of the original star grip screw

Fasten the adapter plate to the 4 additional drill holes using flat head screws M4x10 mm

Please inquire if required and send us the truss.
4 flat head screws M4 x 10 mm are supplied with the return shipment.



Adapter plate for Trimble-Controller TSC 7

For use of the TSC 7 with further accessories e.g. carrying bracket, tripod etc.

There are two ways to screw on the adapter plate.
Instructions see next page, page 190.

- Aluminium, black anodized
- Weight: 110 g

Description	Order-No.	Euro
Adapter plate for Trimble TSC 7, incl. 4 fixing screw M4 x 10 mm	**5832**	68,-

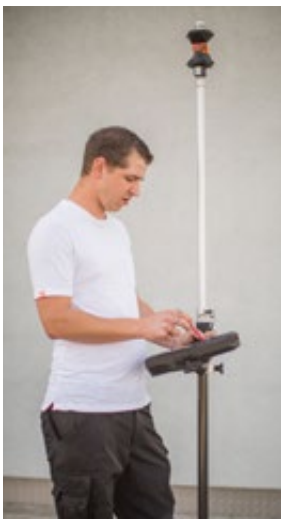
Examples of use

Lightweight tripod „Easy Going“

page 200

For longer use in the same measuring range, the controller does not always have to be worn on the body. It can be operated very easily on the lightweight stand, leaving your hands fr

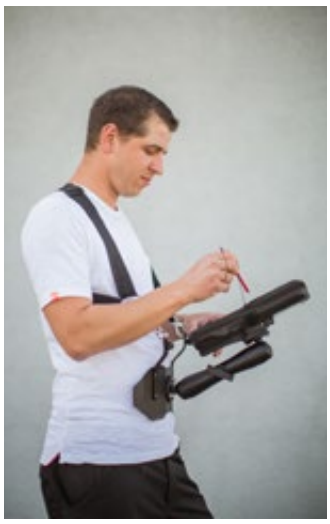
With GNSS-/ prism pole



page 194

With the adapter plate, you can also use our established Bohnenstingl pole clamps, as an alternative to the Trimble pole clamp.

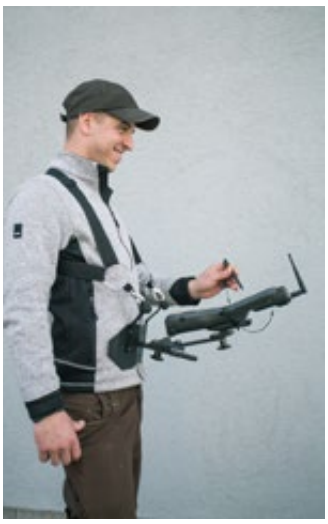
Mobile use with „Carry Easy RAM“



page 209

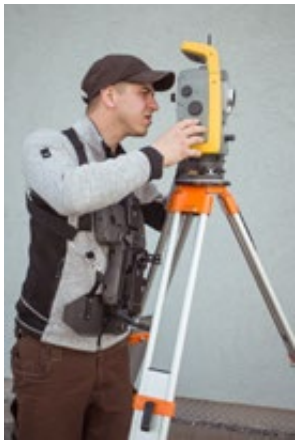
The belly support is equipped with a RAM 1.5" ball. A 1.5" ball is also screwed to the adapter plate.
With the RAM double joints a universal adjustment of the controller is possible.

Mobile use with „Carry Easy Fold“



page 206

The **„carry easy Fold“** holder has a hinge attached to the belly support. This allows for optimal adjustment and folding of the computer.



Instructions for Adapter Plate: Trimble TSC 7

The adapter plate is mounted on the Trimble pole holder for the TSC 7

There are 2 possibilities of installation:

Screwed directly onto controller holder (without crossbar)

Loosen the factory-fitted M4 screws .

Remove the pole connection crossbar.

Screw on the adapter plate with the enclosed 4 flat head screws M4x10 mm.

Screw onto the pole connection crossbar

In addition to the applications with the adapter plate, parallel use of the original Trimble pole clamp remains possible. The only requirement is a crossbar that has four additional M4 threaded holes (made by the factory-side), in addition to the required holes. If necessary, contact your Trimble dealer!

Then the adapter plate can also be screwed in directly.

Fasten the adapter plate to the 4 additional threaded holes using the enclosed M4x10 mm flat head screws.

Adapter for Trimble Spigot Ø1/2“ to M8

Trimble has a unique quick-change system that uses a 1/2“ dia. bolt attached to the field computer/controller holder.

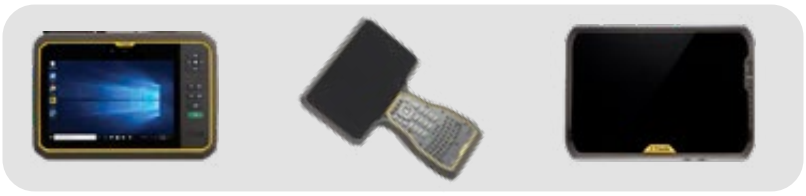
With the **adapter Ø 1/2“ - M8**, the accessories from Bohnenstingl can also be used. The adapter is plugged onto the Trimble bolt Ø 1/2“ and secured by a horizontal screw with star grip. The **inner M8 thread** is used to connect to our accessories, such as holders for poles, tripods and carrying systems (see below).

- Adapter made out of aluminium (anodized)
- Weight: 72 g

Description	Order-No.	Euro
Adapter for Trimble Spigot/bolt Ø1/2“ to **M8**	**5833**	50,-

INFO Trimble mounts with 1/2“ bolt diameter are available for the TSC7, T7 and T100 (see below). For other available models, please contact your Trimble dealer. The bolt can also be retrofitted if necessary.

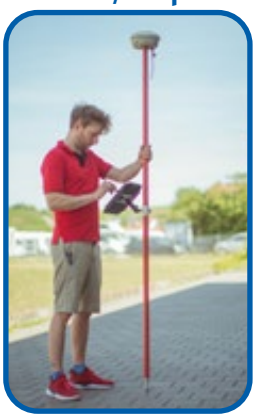
■ **Trimble T7** ■ **Trimble TSC7** ■ **Trimble T100**



Mobile

With carrying system „Carry Easy“
page 206

Pole / Tripod



Pole mount
page 194

Light Tripod

Easy Going tripod
page 200

Smartphone Holder RAM X-Grip

Holders for the secure mounting of smartphones on poles.

To insert the device, the holding clamp is pressed slightly open by hand. An integrated tension spring exerts constant and even pressure on the housing of the smartphone via four rubberized support points. To remove the device, the X-clip is slightly pressed apart again.

- With 1" RAM ball on the back
- Including rubber pad, which can be optionally attached as an additional safety feature to prevent the device from falling out (see below)
- Integrated tension spring
- 4 rubberized retaining claws
- Available in two sizes

Description	Order-No.	Euro
Smartphone Holder X-Grip: For **devices width up to 82 mm**	**5861**	52,–
Smartphone Holder X-Grip: For **devices width up to 114 mm**	**5862**	55,–

Rubber pad as additional protection

Under extreme circumstances (e.g. use of the holder on/in vehicles, strong vibrations etc.) it may be useful to use the rubber pad supplied with the unit. It is put over the retaining clip from behind. Then the rubber slings are pulled over the 4 corners of the smartphone (see picture). Thus the Smartphone is additionally protected from falling out.

Accessories

Basically, any suitable RAM accessory can be connected to the rear 1" RAM ball. If the Smartphone is to be used as compactly as possible on a rod, we recommend the combination of the very short double joint 4805.05 and the universal pole clamp 4810.1 below.

Description	Order-No.	Euro
RAM double socket for 1" ball connection, 50 mm	**4805.05**	23,-

For other lengths of the double socket, as well as other RAM connection possibilities page 215 .

Description	Order-No.	Euro
Pole clamp **Ø 18 to 32 mm**, with RAM 1"-ball	**4810.1**	79,-

Pole clamps for other diameters or exclusively Ø32 mm: page 197.

Accessories for Computer Holders

After choosing the right computer holder, you need to find the right accessories. Do you like to have the calculator with you on a pole, on an extra tripod or mobile with a carrying system? Our accessories guarantee a quick change between all application areas.

On the pole or on the tripod leg

Thread or RAM ball make it possible to connect the computer to a pole holder. Pole mounts are available with clamps from Ø18 to Ø40 mm.

Pole solutions for special holders s. page 194
Pole solutions for universal holders & smartphone mounts s. page 195

On light tripod „easy going“ or other tripods

Each computer mount has a thread or RAM ball on the back. Combined with an adapter, the computer can be placed on any tripod. Our lightweight tripod „easy going“ was specially developed for use in the field.

Tripod solutions s. page 200

Mobile use with carrying systems

In the field, working with a light tripod or a holder attached to the pole is not always the best solution. If you want to be as mobile as possible, a carrying system in which the computer is worn on the body is a good choice.
Please refer to the overview to find out which carrying system is suitable for your holder:

Carrying systems s. page 201

Use in vehicle

Our suction mounts are simply attached to the windshield similar to a navigation system.

Suction holder for cars s. page 211

With hook for hanging on instrument tripod

A classic instrument tripod offers the possibility of simply attaching the computer holder to the metal tabs on the tripod plate using a hook. An additional joint offers the possibility to adjust the angle. In addition, the computer can also be optimally positioned on the desk in the office.

Hook and joint suppor s. page 212

Other accessories

- Mouse tray s. page 213
- Pen holder s. page 213
- Positioning pins s page 213
- 3/8“ to 1/4“ adapter s. page 213
- Tripod leg clamp s. page 217

Computer holders for specific computer types: Clamping to poles or tripod legs

Panasonic / Leica

Panasonic FZ-G2

with thread
No. **5849**
184,-
page 173

only with thread connections available*

Panasonic FZ-G1 Leica CS35

with thread
No. **5846**
184,-
page 174

with RAM-ball
No. **5846.R**
184,-
page 174

Panasonic FZ-M1

only with RAM-connection available

with RAM-ball
No. **5870.M1.R**
137,-
page 176

Panasonic CF-20

with thread
No. **5870.CF20**
158,-
page 177

only with thread connections available*

Panasonic FZ-A3

with thread
No. **5870.A3**
160,-
page 183

only with thread connections available*

Leica CS 10/15/20

with thread
No. **5272**
86,-
page 187

only with thread connections available*

Getac

Getac F110

with thread
No. **5870.F110**
160,-
page 181

only with thread connections available*

Getac T800

with thread
No. **5870.T8**
116,-
page 180

only with thread connections available*

Getac UX10

with thread
5870.UX10
160,-
page 182

only with thread connections available*

Trimble

Trimble TSC7

with thread
No. **5832**
68,-
page 189

only with thread connections available*

Trimble T10

with thread
No. **5847**
184,-
page 175

only with thread connections available*

RAM-1“-ball to retrofit
No. **5175** • 14,-
page 214

*) With the RAM-1“ ball all holders with threaded connection can also be adapted to the RAM-ball-system/accessories

RAM 1.5“ Systems
page 214

1/4“ Thread adapter
page 213

Ball head M8, star screw
No. **5081.3** • 56,-
page 196

RAM Mount, star screw
No. **4800.M8S** • 58,-
page 196

RAM double jount
various lengths
page 215

Slotted pole clamp
No. **5020.18** • 79,-
page 196

Pole clamp, with RAM-1“
No. **4810.1** • 79,-
page 197

On pole with slotted crossbar

On pole with RAM joint

prices do not include any taxes

ALOVAR Universal computer holders and smartphone mounts: Attachment to pole and tripod legs

Universal Holders S1, S2, 270, 320

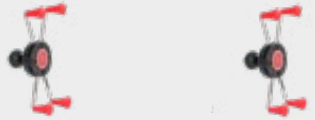
with thread
No. **5870.S2** • 100,-
page 185

with thread
No. **5870.S1** • 100,-
page 185

with thread
No. **5870.270** • 116,-
page 185

with thread
No. **5870.320** • 131,-
page 185

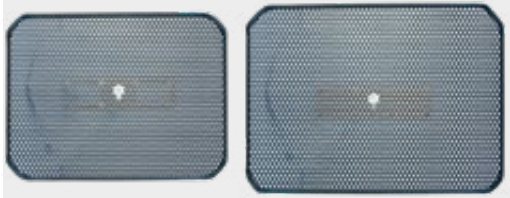
Smartphone Holders



with RAM ball
No. **5861** • 55,-
page 192

with RAM ball
No. **5862** • 58,-
page 192

Universal Holders 370, 420



Due to the large width and depth of the ALOVAR-370 and 420 holders, they are not compatible with pole holders at all or only to a limited extent.

with thread
No. **5870.370** • 147,-
page 185

with thread
No. **5870.420** • 163,-
page 185

On pole/tripod with slotted crosshead

RAM-1"-ball to retrofit
No. **5175** • 14,-
page 214

ball head M8
No. **5081.3** • 56,-
page 196

RAM mount with M8
No. **4800.M8S** • 58,-
page 196

Slotted crossbar with pole clamp
for various pole-Ø
page 196

On pole/tripod with RAM joint

RAM-1"-ball to retrofit
No. **5175** • 14,-
page 214

RAM double joint
various lengths
page 215

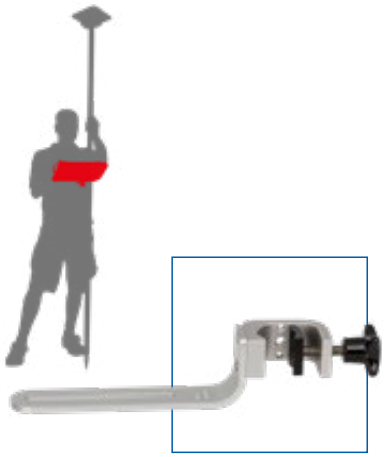
Length recommendations:
5861/5862: 4805.05
5870.S1/.S2/.270: 4805.08
5870.320: 4805.14

Pole clamp with RAM-ball
for various pole-Ø
page 197

RAM 1.5" Systems
page 214

1/4" thread adapter
page 213

prices do not include any taxes



Ø 18 - 32 mm

Ø 32 mm

Long hole beam with pole clamp

- The slotted hole beam allows an optimized installation of the computer with minimum distance to the pole, either on the side or in front of it
- With the ball head, the display can be ergonomically adjusted (inclined and rotated) with regard to thesunlight
- With the stable screw clamp, the holder can be attached to the pole

Description	Order-No.	Euro
Slotted beam with clamp for poles with **Ø 18 to 32 mm**	**5020.18**	79,-
Slotted beam with clamp for poles with **Ø 30 to 45 mm**	**5020.45**	79,-
Slotted beam with clamp for poles with **Ø 32 mm**	**5020.F**	79,-

INFO If only poles with **Ø 32 mm** are used, we recommend the clamp 5020.F to protect the pole material.

Ball head with bottom star grip screw

Description	Order-No.	Euro
Ball head **M8** with star grip screw / counter nut	**5081.3**	56,-
RAM-mount M8 with star grip screw	**4800.M8S**	58,-

Application examples

Pole clamp with RAM-ball

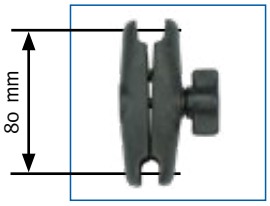
- Stable screw mounting option on the pole
- Joint can be tilted and inclined as desired
- Position is fixed via a central screw

Ø 18 - 32 mm

Ø 32 mm

Description	Order-No.	Euro
Pole clamp **Ø 18 bis 32 mm**, with RAM 1"-ball	**4810.1**	79,-
Pole clamp **Ø 32 mm**, with RAM 1"-ball	**4810.F**	79,-
Pole clamp **Ø 30 bis 45 mm**, with RAM 1"-ball	**4810.2**	79,-

INFO If you are using poles with **Ø32 mm** exclusively, we recommend using the 4810.F clamp to protect the pole material.



Double Joint Beam

Connecting piece between pole clamp and computer holder with RAM connection.

Description	Order-No.	Euro
RAM 1" double joint beam L= 80 mm	**4805.08**	26,-

SECO-Claw-Clamp and Adapter

Advantages as above, but with an additional function: With the push button of the SECO connection, the holder with both RAM-1" balls and the double joint can be removed, only the SECO clamp remains on the pole.

Description	Order-No.	Euro
Claw-Clamp from SECO for poles with Ø32 mm	**1890.1**	76,-

All commercially available SECO clamps (screw clamps and CLAW clamps) can be used.

Description	Order-No.	Euro
Adapter SECO-Clamp - RAM 1"-ball	**4808**	47,-

Double Joint

The same double joint is required as above.

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Holder on Tripods

Holders with thread connection

Special holders s. page 172
Universal holders s. page 184

Holders with RAM-1“-ball on back

Special holders s. page 172

RAM-1“-ball to retrofit
Art.-No. **5175** • 14,-
page 214

M8 outer

M8 i

Ball head with M8
Art.-No. **5081** • 50,-
page 199

RAM 1“

M8 i

RAM-mount with M8
Art.-No. **4800.M8i** • 47,-
page 199

M8 a

Adapter plate
Art.-No. **3035.1** • 44,-
page 212

An adapter might be required

M8 a

Easy Going Tripod
Art.-No. **5351.2** • 242,-
page 200

1/4“, 3/8“, etc.

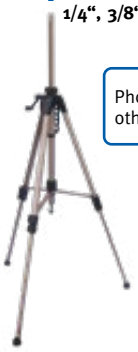


Photo tripods or other tripods

5/8“

Commercially available surveying tripods with 5/8“ connection

Examples

Ball Heads

- Simple and stable clamping of the ball head with lateral star grip
- Optimal adjustment within seconds of the computer with regard to ergonomics and sunlight irradiation
- Inner thread in lower part
- External thread on moveable ball-part

Ball heads 1/4", 3/8", M8

Description	max. load	ball head weight	Order-No.	Euro
Ball head **M8-15**	**up to** 3 kg	130 g	**5081**	50,-
Ball head **M8-35**	**from** 3 kg	250 g	**5082**	68,-

INFO Ball heads with 3/8“ or 1/4“ threads (instead of M8) are also also available on request.

Quick-change feature of the ball head

Our ball heads no. 5081, 5082 and 5084 are equipped with a quick-change feature, when using multiple ball head base parts. By the use of multiple ball head base parts the application area of the computer can be changed within seconds.

The pictures show a field computer when changing from a lightweight tripod easy-going to a GNSS or prism pole mount.

The star grip screw is loosened and unscrewed until the upper part of the ball head with the computer holder can be removed. The lower part remains on the tripod or the holder.

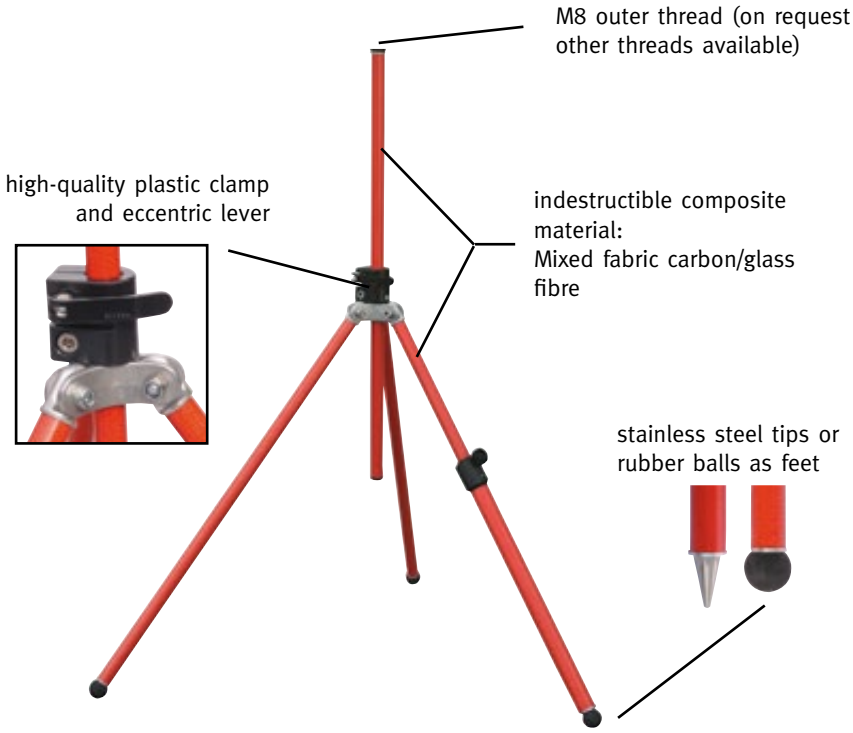
Description	Order-No.	Euro
Base part of the ball head M8-15	**5081.5**	17,-
Base part of the ball head M8-35	**5082.15**	21,-

Lightweight tripod "easy going"

The computer on the tripod can be placed anywhere next to the total station. When measuring in robotic mode, the computer can be easily picked up and put down directly at the object point. There, no heavy device dangling around the neck prevents the operator from carrying out further work in addition to the actual measuring activity.

Features

- Very light (850 g), easy to operate and extremely sturdy
- Comfortable carrying of the tripod even in chilly weather
- Dimensions: 0,75 m (retracted) up to 1,2 m (extracted)
- **1 leg is telescopic:** Adjusting the tripod perpendicularly even in extreme terrain



Lightweight Tripod easy going

Description	Order-No.	Euro
Tripod M8 outer thread "easy going" **with rubber ball feet**	**5351.2**	242,-

Spare parts: Tripod foot tips

Description	Order-No.	Euro
Stainless steel tips with M6 inner threads, 3 pieces	**5355**	21,-
Rubber ball feet Ø25 mm with M6 inner threads, 3 pieces	**5356**	21,-

Matching ball heads, adapters and holders:

- page 198 - for special holders
- page 198 - for univeral holders (System ALOVAR)

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prices do not include any taxes

Mobile operation with Carrying Systems


Cross strap


Neoprene strap


Carry Easy Harness
(s. page 206)


4-Point-System
(s. page 205)


Strap adapter with brackets
(s. page 204)


Eyelets
(s. page 203)

Which carrying system is compatible with your computer holder please refer to the table on page 202.




Carrying straps

Cross Strap

- Weight is evenly distributed on the shoulders. Long and comfortable carrying is possible
- Well finished seams and sturdy metal carabiners

Description	Order-No.	Euro
Cross straps with 2 metal carbines	**5790**	47,-

Neoprene Strap

- Uncomplicated carrying around the neck
- Particularly recommended when frequently switching between stationary and mobile work

Description	Order-No.	Euro
Neoprene strap with 2 plastic carbines	**5780**	29,-

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prices do not include any taxes

Carrying Systems

1. Choose computer/ holder

2. Find a system

Panasonic / Leica

Panasonic FZ-G2
Art.-No. **5849** • 184,- page 173
Systems: A1, A2, E1, E3, F2, F4, H2

Panasonic CF-20
Art.-No. **5870.CF20** • 158,- page 177
Systems: B2, E1, E3, F2, F4, H2

Panasonic FZ-A3
Art.-No. **5870.A3** • 160,- page 183
Systems: B2, E1, E3, F2, F4, H2

Panasonic FZ-G1 / Leica CS35
Art.-No. **5846** • 184,- page 174
Systems: A1, A2, E1, E3, F2, F4, H2

Pre-mounted RAM-Ball-Connection:
Art.-No. **5846.R** • 184,- page 174
Systems: A1, A2, E2, F3

Panasonic FZ-M1 (RAM)
Art.-No. **5870.M1.R** • 137,- page 176
Systems: D1, E2, F3

Adapter plate: Leica CS 10/15/20
Art.-No. **5272** • 86,- page 187
Systems: E1, E3, F1, F2, F4, H2

Getac

Getac F110
Art.-No. **5870.F110** • 160,- page 181
Systems: B2, E1, E3, F2, F4, H2

Getac T800
Art.-No. **5870.T8** • 116,- page 180
Systems: B2, D1, E1, E3, F2, F4, H2

Getac UX10
No. **5870.UX10** • 160,- page 183
Systems: B2, E1, E3, F2, F4, H2

Trimble

Trimble T10
Art.-No. **5847** • 184,- page 175
Systems: A1, A2, E1, E3, F2, F4, H2

Adapter plate: Trimble TSC7
Art.-No. **5832** • 68,- page 189
Systems: E1, E3, F1, F2, F4, H2

Bolt Adapter: Trimble T7
Art.-No. **5833** • 50,- page 191
Systems: E1, F2

Bolt Adapter: Trimble T100
Art.-No. **5833** • 50,- page 191
Systems: E1, F2

Microsoft

Microsoft Surface Book 2
Art.-No. **5877.MS01** • 163,- page 186
Systems: C1, F2, H2

Universal Holder ALOVAR

Universal Holder ALOVAR S1
Art.-No. **5870.S1** • 100,- page 184
Systems: D1, E1, E3, F1, F2, F4, H2

Universal Holder ALOVAR S2
Art.-No. **5870.S2** • 100,- page 184
Systems: C1, D1, E1, E3, F1, F2, F4

Universal Holder ALOVAR 270
Art.-No. **5870.270** • 116,- page 184
Systems: B1, B2, C1, D1, E1, E3, F2, F4

Universal Holder ALOVAR 320
Art.-No. **5870.320** • 131,- page 184
Systems: B1, B2, C1, E1, E3, F2, F4

Universal Holder ALOVAR 370
Art.-No. **5870.370** • 147,- page 184
Systems: C1, E3, F2, F4, H2

Universal Holder ALOVAR 420
Art.-No. **5870.420** • 163,- page 184
Systems: C1, F2, H2

	RAM adapter	ball head	expansion	Suspension system	strap	
A1						No. **5238** • 89,- page 204 No. **5790** • 47,- page 201
A2						No. **5238** • 89,- page 204 No. **5780** • 29,- page 201
B1						No. **5238.L** • 89,- page 204 No. **5790** • 47,- page 201
B2						No. **5238.L** • 89,- page 204 No. **5780** • 29,- page 201
C1						No. **5786** • 15,- page 205 No. **5790** • 47,- page 201
D1						No. **5784** • 15,- page 203 No. **5780** • 29,- page 201
E1						No. **5081.3** • 56,- page 199 No. **5740** • 173,- page 206 No. **5790** • 47,- page 201
E2						**4800.M8S** • 58,- page 196 **5740** • 173,- page 206 **5790** • 47,- page 201
E3						No. **5175** • 14,- page 214 No. **4800.M8S** • 58,- page 196 No. **5740** • 173,- page 206 No. **5790** • 47,- page 201
F1						No. **5742** • 145,- page 208 No. **5740** • 173,- page 206 No. **5790** • 47,- page 201
F2						No. **5081** • 50,- page 199 No. **5742** • 145,- page 208 No. **5740** • 173,- page 206 No. **5790** • 47,- page 201
F3						No. **4800.M8i** • 47,- page 199 No. **5742** • 145,- page 208 No. **5740** • 173,- page 206 No. **5790** • 47,- page 201
F4						No. **5175** • 14,- page 214 No. **4800.M8i** • 47,- page 199 No. **5742** • 145,- page 208 No. **5740** • 173,- page 206 No. **5790** • 47,- page 201
G1						No. **5743** • 66,- page 207 No. **5740** • 173,- page 206 No. **5790** • 47,- page 201
H1						No. **4806.23** • 48,- page 215 No. **5740.R** • 173,- page 209 No. **5790** • 47,- page 201
H2						No. **5176** • 25,- page 214 No. **4806.23** • 48,- page 215 No. **5740.R** • 173,- page 209 No. **5790** • 47,- page 201

Mobile use with ring eyelets and carrying strap

Two ring eyelets are attached diagonally to each other to the mount on the sides of the holder (see pictures). A 2-point strap or a cross strap can be attached to the eyelets.
The 2-point system has the advantage that the tablet can be folded to the body (see picture) easily when not in use. This ensures a clear view of the ground when walking.

Ring Eyelets

Description	Order-No.	Euro
Ring eyelets (V2A), **2 pc**. and 4 pc. knurled nut (plastic)	**5784**	15,-

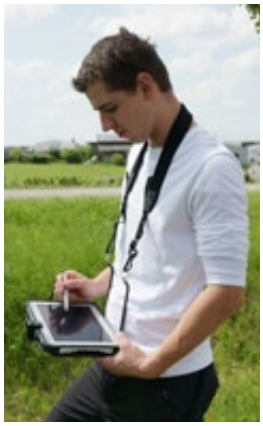
Neoprene Carrying Strap

Description	Order-No.	Euro
Neoprene strap with 2 plastic carbines (s. page 201)	**5780**	29,-

INFO Please refer to our compatibility table on page 202 to find out whether the eyelets are compatible with your computer holder.

Mobile use with strap adapter / carrying strap

In the field, working with a light tripod or a holder attached to the pole is not always the best solution.
If you want to be as mobile as possible and carry the computer "around your neck", you can attach a strap adapter to the holder. No changes are necessary on the computer itself.
Due to the geometry of the retaining brackets, the holder hangs with the computer horizontally. The display is completely visible, no strap obstructs the operation of the touch screen during pen operation.



Description	Order-No.	Euro
Strap adapter with two brackets for **ALOVAR**-holders	**5238.L**	89,-
Strap adapter with two brackets for holders 5846, 5847, 5849	**5238**	89,-

Cross Strap

Description	Order-No.	Euro
Cross strap, with two metal carbines (s. page 201)	**5790**	47,-

Neopren-Tragegurt

Description	Order-No.	Euro
Neoprene strap with 2 plastic carbines (s. page 201)	**5780**	29,-

INFO Please refer to our compatibility table on page 202 to find out whether the strap adapter is compatible with your computer holder.

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prices do not include any taxes

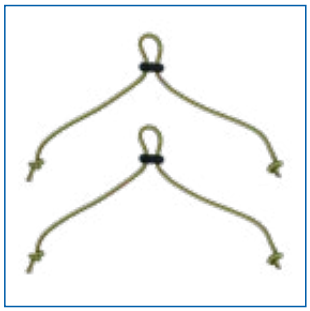
Example image

Mobile use with carrying strap / 4-point system

For ALOVAR holders S1, 270-420, as well as holders CF-20, F110.

Somewhat larger and heavier computers are better when carrying their weight distributed and balanced over 4 instead of 2 points of the holder.

The two cord-strap adapters are inserted through the perforated plate to the left and right of the computer and fastened with a knot underneath the holder. A stable cord stopper creates a loop to which the carrying strap is attached (detailed instructions available).
A 2-point strap or cross strap can be used; due to the geometry of the strap adapters, the holder always hangs horizontally with the computer. The keyboard or display can be used without restriction.
The advantage of the system is the easy disconnection of the carrying strap from the holder with only two carabiners. For temporary use in the office or on a tripod, the strap adapter can remain mounted.



Description	Order-No.	Euro
Cord-Strap-Adapter ALOVAR **F110, CF-20, S1, 270, 320 (2 pc.)**	**5786**	15,-
Cord-Strap-Adapter ALOVAR **370, 420 (2 pc.)**	**5787**	15,-

Cross strap

Description	Order-No.	Euro
Cross strap with two metal carbines (s. page 201)	**5790**	47,-

INFO Please refer to our compatibility table on page 202 to find out whether the cord-strap adapter is compatible with your computer holder.

Mobile Carrying holder „Carry Easy“

With the "Carry Easy" holder, tablets, controllers, field computers and computers up to a size of approx. 12" can be carried and operated in the field in front of the body / abdomen. We have fundamentally revised the mount. The main part "basic" is always necessary. As before all computer mounts can be used which are equipped with a ball head / ball joint.

Now "**basic**" can be extended by two additional variants.

With the additional part "**pole**" field computer mounts can be adapted, which can be screwed to a prism or GNSS pole via a clamp.

The additional part "**fold**" represents a real innovation. The main advantage is that the device can be folded towards the body very quickly via a hinge.

Finally, double joints of the RAM system 1.5" can be used with the likewise new "**Carry Easy RAM**".

Carry Easy „Basic“

- Abdominal support: An ergonomically shaped, powder-coated aluminum plate with foam rubber overlay provides a **pleasant distribution of the supporting force** to the abdominal and hip area
- Belt braces: A two-point riser can be quickly and safely attached to two struts mounted on the plate. The design of the struts ensures that the computer is **evenly balanced**. To distribute the weight evenly over the shoulder area, we recommend the use of our cross strap
- Long hole traverse: An M8 star grip screw is used to fasten the controllers and field computers at the **optimum distance from the body**:
  - With ball head M8 (s. page 207)
  - With RAM-1“-ball mount (s. page 207)
  - With add-on item „pole“ (s. page 207)
  - With add-on item „fold“ (s. page 208)

Along the slotted traverse, the mount can be adjusted to the most ergonomically favourable body distance for operating the computer and tilted via the ball head so that the screen can be viewed optimally.

Description	Order-No.	Euro
Carry Easy „Basic“ (without carrying strap)	**5740**	173,-

Carrying Strap

- Weight is evenly distributed on the shoulders. A long comfortable carrying is possible
- Well processed seams and stable metal carabiners

Description	Order-No.	Euro
Cross belt with 2 metal carabiners	**5790**	47,-

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Carry Easy „Ball Head M8“

For computer mounts with M8 female thread.

- To screw the ball head into the M8 female thread of the computer holder
- Move the ball head on the slotted hole of the "Basic-Traverse" until the optimal distance of the computer from the body. Tightening with M8 star grip screw
- Adjust the inclination with the horizontal M8 star grip screw on the ball head

Description	Order-No.	Euro
Ball head **M8** with star grip screw	**5081.3**	56,-

Carry Easy „RAM 1“-Mount“

For computer mounts with RAM-1" ball.

- Inserting the RAM-1" ball from the computer holder into the RAM mount
- Move the ball holder on the slotted hole of the "Basic Traverse" until the optimal distance of the computer from the body is reached. Tighten with M8 star grip screw
- Adjust and fix the inclination with the horizontal wing screw on the ball holder

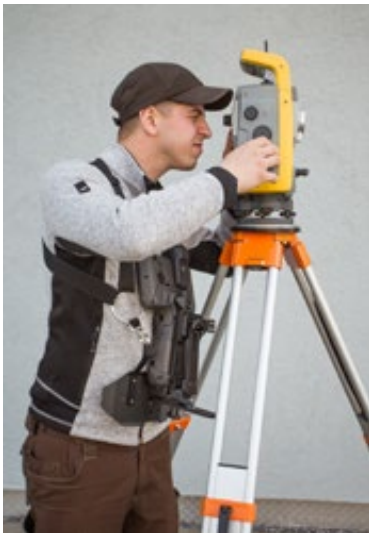
Description	Order-No.	Euro
RAM-ball mount M8 with wing screw	**4800.M8S**	58,-

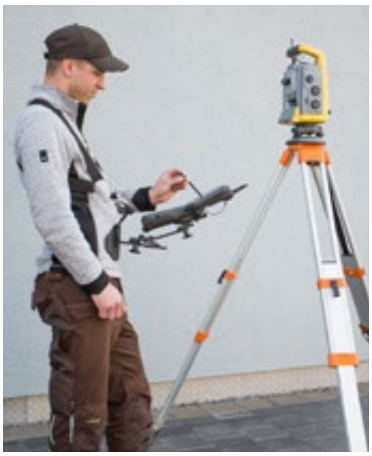
Carry Easy „Pole“

For lightweight computers and controllers to quickly switch between use on the GNSS/ prism pole and the "carry easy" support

An extension arm with pole piece Ø32 mm is attached to the "basic" slotted hole traverse with optimum body distance using the M8 star grip screw. It is swung out laterally so that the computer is positioned exactly in the center of gravity. The controller is attached to the Ø32 mm pole piece with the existing standard pole clamp of the controller holder. Usually, the inclination can also be adjusted with this clamp.

Description	Order-No.	Euro
Carry Easy „Pole“ - add-on item for „carry easy basic“	**5743**	66,-





Carry Easy „Fold“

With the folding mechanism, field-suited computers and controllers can be optimally used on the move.
When folded out, the respective device can be perfectly adjusted in terms of ergonomics, operation and readability. The pleasantly large distance to the body provides a good view of the display, and the neck does not have to be stretched as much when looking down. In addition, an inclination adjustment of the device is possible.

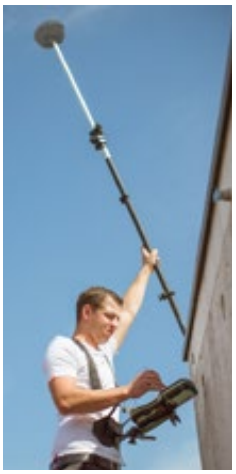
With a quick grip the computer can be "put away" by folding it against the body.

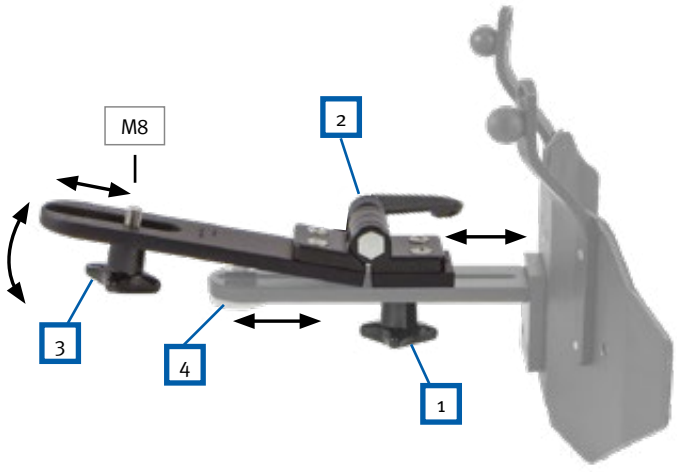
Advantages of folding

- The computer lies securely on your body. Screen and keyboard are protected against weather (rain, snow, etc.)
- Protect the device from shocks or damage. The danger of "getting stuck", e.g. when walking through narrow places such as bushes, is also reduced
- The center of gravity of the device is close to the body, the leverage of the weight mass is reduced
- Free view of the ground/runway
- No getting stuck on the tripod or total station/instrument during operation. When the instrument is folded up, settings are made on the total station/total station.
- After the instrument has been folded out, at an appropriate distance from the tripod, inputs, readings and measurements are taken on the computer.
  A quick change is possible

Properties of „Fold“

1. Moving the "Fold" add-on part along the "basic" oblong hole traverse using an M8 tightening screw
2. Stable hinge with adjustable lever for tightening
3. Flip-up bar with slotted hole and non-detachable M8 star grip with external thread for screwing on the holders for controller and field computer
4. Adjustable support screw to adjust the optimal inclination of the bar and thus the computer / controller





Description	Order-No.	Euro
Carry Easy „Fold“ - add-on item for „carry easy basic“	**5742**	145,-

Carry Easy RAM 1.5“

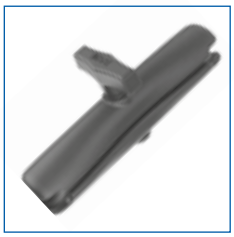
Allows the use of double joints of the company RAM-Mount with **ball-Ø 1.5“**.

- Abdominal support: An ergonomically shaped, powder-coated aluminum plate with foam rubber overlay provides a **pleasant distribution of the supporting force** to the abdominal and hip area
- Belt braces: A two-point riser can be quickly and safely attached to two struts mounted on the plate. The design of the struts ensures that the computer is **evenly balanced**. To distribute the weight evenly over the shoulder area, we recommend the use of our cross strap
- 1.5“-RAM-ball: Commercially available RAM double joints can be attached
- Matching cross strap, see page 201

Description	Order-No.	Euro
Carry Easy RAM **Ø 1.5“** (without cross strap)	**5740.R**	173,-

Additional 1.5" RAM accessories

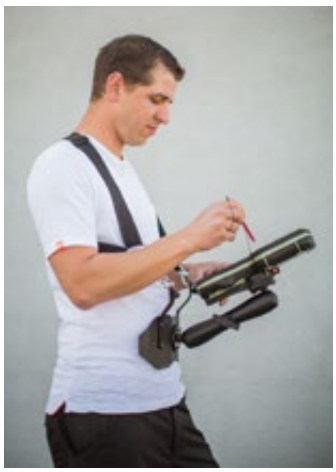
Description	Order-No.	Euro
RAM ball, **Ø 1.5“**, for retrofitting, with M5 screw	**5176**	25,-



Further information about 1.5" RAM accessories s. page 215.

Description	Order-No.	Euro
RAM Ball **Ø 1.5“**, double joint, approx. 230 mm	**4806.23**	48,-

Example application: With RAM double joint / Leica Viva CS20



Carry Easy - Overview

To be found separately: RAM 1.5" ball connectors s. page 209

RAM 1"-ball, for retrofitting
Item no. **5175** • 14,- Euro
page 214

RAM-mount with star screw
Item no. **4800.M8S** • 58,- Euro
page 207

Cross strap
Item no. **5790** • 47,- Euro
page 201

Carry Easy „Basic"
Item no. **5740** • 173,- Euro
page 206

M8

Ball head M8, with star screw
Item no. **5081.3** • 56,- Euro
page 207

M8

Carry Easy „Fold"
Item no. **5742** • 145,- Euro
page 208

Carry Easy „Pole"
Item no. **5743** • 66,- Euro
page 207

Special Computer Holders
Panasonic FZ-G2 Seite 173
Panasonic FZ-G1 page 174
Panasonic CF-20 page 177
Panasonic FZ-A3 page 183
Panasonic FZ-M1 page 176
Trimble T10 page 175
Getac F110 page 181
Getac T800 page 180
Getac UX10 page 182
Leica CS35 page 174

ALOVAR Universal Holders
Various sizes,
recommended up to size 320
page 184

Adapter plate
Leica Viva CS10, CS15, CS20
Item no. **5272** • 86,- Euro
page 187

Adapter plate Trimble TSC 7
Item no. **5832** • 68,- Euro
page 189

Trimble bolt adapter M8
Item no. **5833** • 50,- Euro
Seite 191

Holders with pole clamps
for example: Seco

Vehicle computer suction holder

To operate/monitor a computer from the driver's or passenger's seat

By positioning the suction cup holder on the windscreen and the telescopic pull-out, a computer holder can be attached quickly and easily to the desired spot.

- Suitable for almost all cars with an inclined windshield, without any obstruction to the instruments on the dashboard
- Solid construction: outer tube of the traverse made of GFK/CFK, housing of the suction cup and telescopic slide made of aluminium
- Telescope extendable from 22 to 35 cm
- High holding force due to suction holder surface with Ø 120 mm
- With integrated vacuum loss indicator for optical vacuum control
- No greater field of vision restriction due to the suction holder than with a mobile navigation device
- The suction holder is certified in Germany. A general approval for motor vehicles although has not been applied for
- Ball head for optimal aligment of computer

The suction cup is pressed firmly onto the windscreen with the rubber pane relaxed. When the toggle lever is turned, the resistance of the vacuum generation must be clearly noticeable.
The additional vacuum safety indicator guarantees continuous visual control of the vacuum. If the suction holder loses vacuum, a rocker indicator signals this to the user.

With M8 ball head

- Stable support for computers up to 3 kg weight±
- Large star grip screw for fixing the computer position, 360° adjustable

Description	Order-No.	Euro
Vehicle-Computer-Suction Holder, telescopic, M8 ball head	**5827.M**	194,-

With RAM-ball mount

- Stable support for computers up to 1.5 kg weight
- Two-wing screw for fixing the computer position
- Hexagon nut (SW 13) for alignment of the ball holder

Description	Order-No.	Euro
Vehicle-Computer-Suction Holder, telescopic, RAM-Ø **1"**-ball	**5827.R**	194,-

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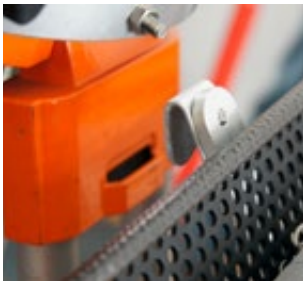
Hook and support joint for the instrument stand

The hook can be used to hang the holder to the brackets on the head of the instrument stand. The additional support joint enables the optimal tilt adjustment of the display with regard to operability and sunlight irradiation.
The computer with the support joint can also be optimally positioned on the desk.
The hook and support joint can be retrofitted.



Hook

- Mounting at the top of the computer holder with 2 knurled nuts
- Weight: 35 g

Description	Order-No.	Euro
Hook for **ALOVAR**-holders*	**5382.L**	32,-
Hook especially designed for Panasonic **FZ-G1** holder	**5382**	32,-
Hook especially designed for Panasonic **CF-20** holder	**5383**	34,-

* ALOVAR 320, 370, 420, Getac F110 holder

Support Joint

- Tilting angle adjustable with wing screw
- Upholstery of the support with sponge rubber cover
- Mounting with screws (screws for ALOVAR **and** FZ-G1/T10 holders included)
- Weight: 100 g

Description	Order-No.	Euro
Support joint for **FZ-G1**, **T10** and **ALOVAR** mounts*	**5381**	68,-

* ALOVAR 320, 370, 420, Getac F110 holder, Panasonic CF-20 holder

Tripod plate for Instrument Tripods

Bottom thread: 5/8”-Internal thread for use on all instrument tripods with flat tripod head and 5/8" tightening screw
Top thread: M8 or 3/8"outer thread (stainless steel)

Description	Order-No.	Euro
Tripod plate 5/8", **M8** outer thread	**3035.1**	44,-
Tripod plate 5/8", **3/8"** outer thread	**3035.3**	44,-

All ball heads/joints with an M8 or 3/8" internal thread can be screwed onto the tripod plate. An overview of all ball heads can be found on page 199.

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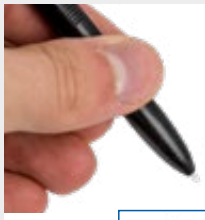
prices do not include any taxes



Additional Accessories

Pen holder

With the retrofittable pen holder, the pen can be easily put down to the side of the holder. After inserting the pen into the plastic sleeve, it stands upright and is immediately ready to use. The pen holder can be attached to either the right or left side of the holder.

- For pens with Ø 8 - 12 mm
- Side mounting with knurled nut.
- Weight: 10 g (ALOVAR) / 27 g (FZ-G1, CS35, T10)

Description	Order-No.	Euro
ALOVAR pen holder for Ø 8 - 12 mm (with knurled nut M5)	**5841.U**	16,-
FZ-G1 / CS35 / T10 pen holder for Ø 8 - 12 mm (with nut M5)	**5840.U**	22,-

INFO Bigger Ø for both pen holders (ALOVAR or FZ-G1) on request!

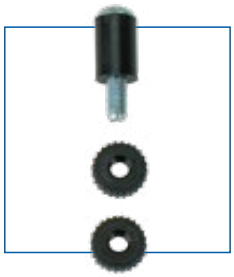
Mouse Tray for ALOVAR

If you like to work with an ordinary external mouse, we offer the possibility of an additional mouse tray to attach. For this only two screws are put through the perforated plate of the ALOVAR holder and fixed with two knurled screws.

- Useable space: 240 mm x 200 mm
- Weight: 400 g
- Including mounting material and mousepad

Description	Order-No.	Euro
Mouse Tray for ALOVAR holders (with mousepad)	**5890**	53,-

Positioning pins for System ALOVAR



With one or more pin(s) the computer can be fixed on the ALOVAR holder as desired and secured against slipping.

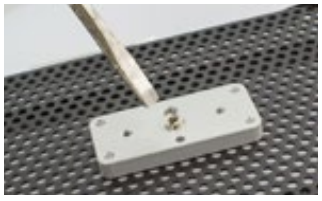
- With plastic sleeve Ø 10 mm
- Fastening with screw and M5 knurled nut
- Weight: 14 g

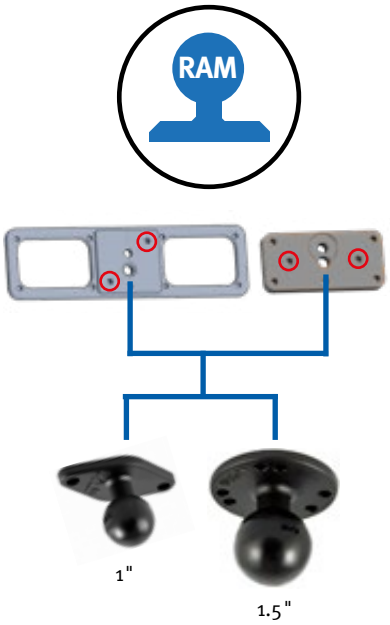
Description	Order-No.	Euro
1 pc. positioning pin ALOVAR, with 2 knurled nuts M5	**5868**	4,-

Thread insert piece 3/8“ - 1/4“

The threaded insert can be screwed into the 3/8“ thread of our computer holders with an ordinary slotted screwdriver (see pictures).
We recommend using the 1/4“ thread only with very light computers.

Description	Order-No.	Euro
Thread insert adapter 3/8" (outer) - 1/4" (inner)	**5170.25**	3,-





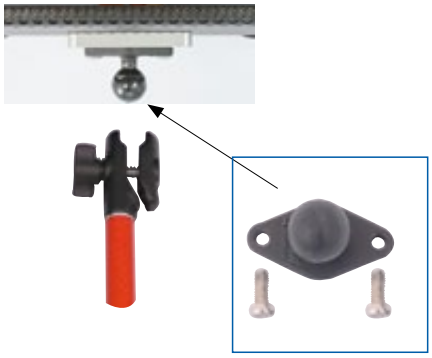
RAM ball retrofitting

All holders available from us (special holder and universal ALOVAR holder) can be easily retrofitted with a RAM ball if required. So you have the possibility to use all RAM accessories.

The majority of the RAM accessories available from us are based on the RAM ball Ø1" (25.4 mm). For particularly heavy or large computers, the 1.5" RAM ball can also be useful. The following RAM balls can be retrofitted to all our computer mounts.

General characteristics of the RAM System

- The rubberized RAM-1" ball is the starting point of the system, which is both simple to use and reliable in practice
- The loosening and fixing between RAM ball and RAM holder is done by a large lever screw
- If the holder is screwed on far enough, the ball (and the holder attached to it) can be easily removed. Inserting and tightening the ball is just as easy



1" RAM Ball

To use the double-joint or the ball socket, the computers or computer holders must be equipped with a 1" ball on the bottom.

- Rubberized 1" ball with two holes Ø 5 mm in the flange
- Included in delivery: Two screws M5 x 10 mm
- Weight: 40 g

Description	Order-No.	Euro
Joint-ball Ø1" (25,4 mm), with two M5 screws	**5175**	14,-

1.5" RAM Ball

To use the double-joint or the ball socket, the computers or computer holders must be equipped with a 1.5" ball on the bottom.

- Rubberized 1.5" ball with two holes Ø 5 mm in the flange
- Included in delivery: Two screws M5 x 10 mm
- Weight: 90 g

Description	Order-No.	Euro
RAM joint ball **Ø 1.5"**, with two **M5** screws	**5176**	25,-

Accessories for 1"-RAM ball

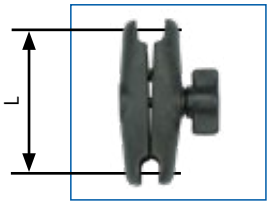
RAM 1" ball mount 3/8" or M8

- For screwing onto tripods and poles
- Sturdy aluminium construction
- Lever screw for fixing / removing the ball
- For computers up to 4 kg
- Weight: 105 g

Description	Order-No.	Euro
RAM 1" ball mount with **M8 inner thread (bottom)**	**4800.M8i**	47,-
RAM 1" ball mount with **3/8" inner thread (bottom)**	**4800.38i**	47,-

RAM 1" double-jointed beam

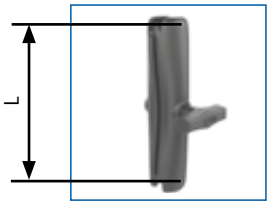
- Sturdy aluminium construction
- Lever screw for fixing / tightening the joints



Description	computer	weight	Order-No.	Euro
RAM 1" double-joint L=50 mm	max. 4 kg	85 g	**4805.05**	23,-
RAM 1" double-joint L=80 mm	max. 3 kg	130 g	**4805.08**	26,-
RAM 1" double-joint L=140 mm	max. 2 kg	230 g	**4805.14**	27,-

Accessories for 1.5"-RAM ball

RAM 1"- double joint extension



- Sturdy aluminum construction
- Large central lever screw for fixing the joint

Description	computer	weight	Order-No.	Euro
RAM 1.5" extension. L=220 mm	max. 5 kg	230 g	**4806.23**	48,-

Our RAM assortment as overview

Threaded plates of our computer holders

RAM 1"- Ball

RAM-Ball Ø 1", with M5
Art.-No. **5175** • 14,- Euro
page 214

RAM Double-Joint extension 1"
L=80 mm **4805.08** • 26,- Euro
L=140 mm **4805.14** • 27,- Euro
page 215

RAM 1"-Ball with SECO-Spigot
Art.-No. **4808** • 47,- Euro
page 197

SECO-System

Seco Claw-Clamp Ø 32
Art.-No. **1890.1** • 76,- Euro
page 197

Pole clamp with 1"-RAM-Ball
Ø 18-32 mm **4810.1** • 79,- Euro
Ø 32 mm **4810.F** • 79,- Euro
Ø 30-45 mm **4810.2** • 79,- Euro
page 197

Slotted hole with pole clamp
Ø 18-32 mm **5020.18** • 79,- Euro
Ø 32 mm **5020.F** • 79,- Euro
Ø 30-45 mm **5020.45** • 79,- Euro
page 194

1"-Ball socket with M8 star screw
Art.-No. **4800.M8S** • 58,- Euro
page 196

Holder "Carry Easy Basic"
Art.-No. **5740** • 173,- Euro
page 206

Extension: "Fold"
Art.-No. **5742** • 145,- Euro
page 208

1"-Ball socket, M8 inner
Art.-No. **4800.M8i** • 47,- Euro
page 199

Tripod Easy Going, M8
Art.-No. **5351.2** • 242,- Euro
page 200

RAM 1.5"- Ball

RAM-Ball Ø 1.5", with M5
Art.-No. **5176** • 25,- Euro
page 214

RAM Double joint Ø 1.5"
Art.-No. **4806.23** • 48,- Euro
page 215

Holder "Carry Easy RAM 1.5"
Art.-No. **5740.R** • 173,- Euro
page 209

Poles or tripod legs with Ø 18-32

Mobile

Lightweight tripod

Mobile

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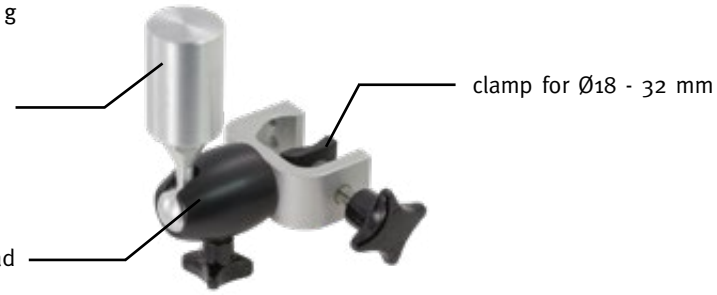
Clamp for computer mounts for tripod legs

For mounting lightweight computers with existing holder for prism/GNSS poles on instrument stand /tripod

For light field computers, holders for vertical prism or GNSS poles are often already present. However, these cannot be easily attached to the instrument tripod due to the inclined legs.

Our new tripod leg clamp is attached to the angled tripod leg-bar. The aluminium cylinder can then be placed vertically over the ball-and-socket joint and the computer holder screwed to it, as it would be done on a prism or GNSS pole.

- For leg Ø 18 to 32 mm
- Aluminium cylinder Ø32 mm
- Weight: 365 g



Description	Order-No.	Euro
Tripod leg clamp with cylinder Ø32 mm for computer holders	**5280**	116,-

Cylinders with other Ø on request!

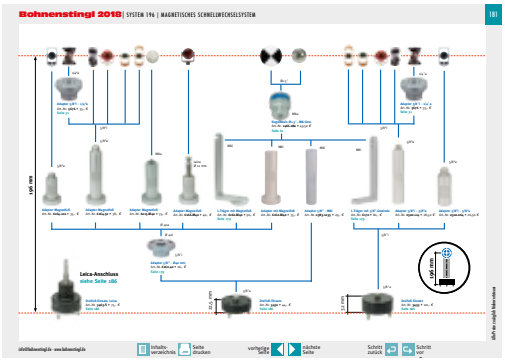
Examples for computers:

- Trimble TSC
- Leica Vica CS20
- SECO clamps Universal and Claw

Laser Scanning / Tachymetry / Georeferencing

Page 1 of 3

I.1 Systems in overview page 219



Systems in overview & Info

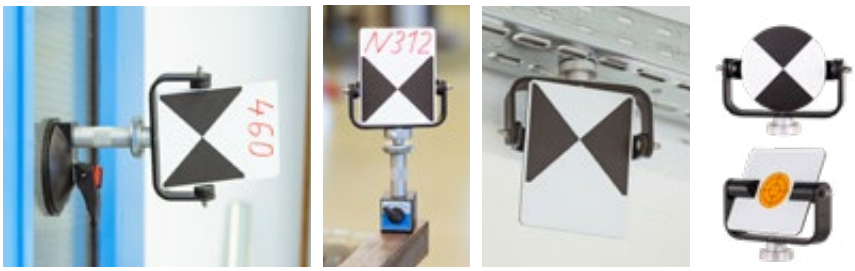
- Georeferencing / Laser scanning
- Target height 60 mm (Leica)
- Wall distance 50 / 100 mm
- Target height 80.8 mm
- Target height: 97 / 100 mm
- Target height: 197 / 200 mm (Ø200 sphere)

I.2 Scan sphere and segment sphere page 224

Laserscanning Sphere

- Scan sphere Ø145 mm
- Scan sphere „segment“ Ø145 mm
- Scan sphere Ø200

I.3 Targets (target size: 110 x 110 mm) page 228



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

I.4 Targets: Ø270 mm in U-Holder, tiltable page 235

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
- With magnetic base Ø40 mm

Laser Scanning / Tachymetry / Georeferencing

Page 2 of 3

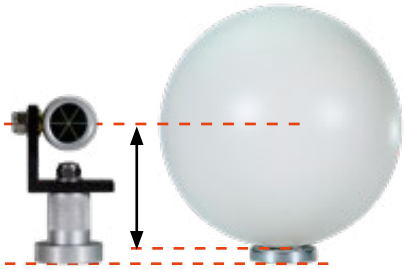
I.5 Laser Scanning Targets Ø270 mm page 236



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

I.6 Prism for georeferencing page 233

Prism for georeferencing

- Tilting axis with different system heights
- Magnetic base Ø40 mm
- For high-precision switch of laser scanning target and prism

I.7 Laser Scanning in free space page 242



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

I.8 Targets für scanning with Drones page 247



Targetfs for scanning with drones

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Laser Scanning / Tachymetry / Georeferencing

Page 3 of 3

I.9 Tripods / adapter for laser scanners page 249

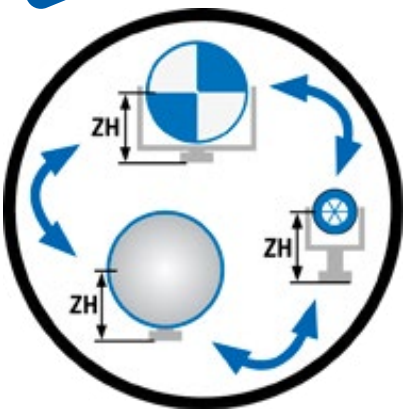
Tripod options for laser scanner

- Adapter plate 5/8“ - 3/8
- Instrument tripod mini

Laserscanning

Targets and prisms for registration and georeferencing

Quick change with identical target centers



Modern processing software allows the registration of point clouds even without targets (target plates/spheres). Nevertheless, targets still have their justification for:

- Registration possibility of point clouds with unclear point identities within the individual scans
- Increase of accuracy and reliability
- Accuracy estimation
- Georeferencing by replacing targets with prisms whose 3D coordinates can be determined tachymetrically with high accuracy

For terrestrial laser scanners we offer scanner spheres with Ø145 mm and Ø200 mm, target plates also in 2 different sizes, in general with a checkerboard pattern. For measuring points with total stations we offer various prism systems, such as the HIP prism series or the ball prisms. We offer target plates and prisms with four different target heights (see overviews on the next pages).
Within a target height, the 3D coordinates of the target centers are identical when targets and prisms are exchanged.

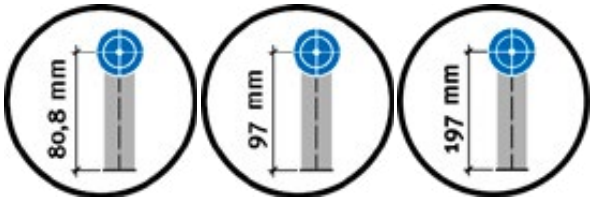
A condition for the exchange possibility is a forced centering of the target and prism holders. Here you can choose between:

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

Quick change with magnetic base for centering plate Ø40 mm

With target height ZH:

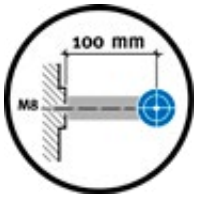
- 80,8 mm s. page 220
- 97 (100) mm s. page 221
- 197 (200) mm s. page 222



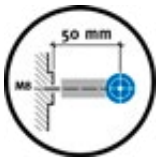
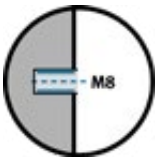
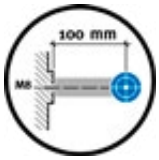
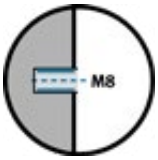
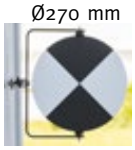
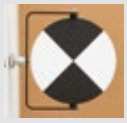
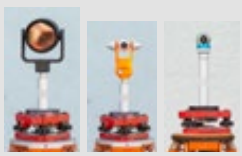
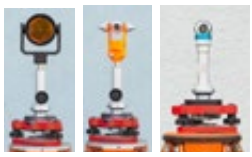
Quick change with mount for spigot Ø12 mm (Leica)

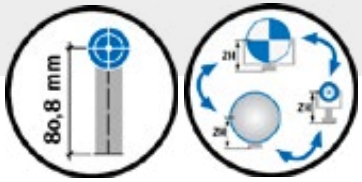
From top edge of bolt target height ZH = 60 mm s. page 231,
With additional distance piece ZH = 160 mm s. page 222

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



With magnetic base Ø40 mm or Leica bolt

overview	Target height / Offset	Quick connection system	Laser Scann. sphere	Laser Scanning Target „Pocket“	Laser Scanning Target Ø270 mm	Total Station Prism/Reflector
thread bases page 76			–	 page 229	 Ø270 mm  page 236	 page 72
overview page 220			Ø145 mm  page 225	 page 228  page 229	–	 page 233
overview page 221			–	 page 231  page 232	–	
overview page 221/ page 223			Ø145 mm  page 225	 page 232	 Ø270 mm  page 236	 page 233
overview page 7			Ø145 mm  page 225	 page 231	 Ø270 mm  page 236	
-			Ø200 mm  page 227	–	–	 page 233
overview page 222			Ø200 mm  page 227	–	Ø270 mm  page 235	
overview page 222			Ø200 mm  page 227	–	Ø270 mm  page 235	
overview page 256			–	 page 231  page 232	–	
overview page 240			Ø145 mm  page 225	 page 228  page 229	 Ø270 mm  page 236	
overview page 240			Ø200 mm  page 227		 Ø270 mm  page 236	



TLS - Magnetic quick change system, ZH = 80,8 mm

80,8 mm

72,5 mm

196 mm

150 mm

Scanning sphere Ø145 mm
Various designs
page 224

Segment Flex Ø145 mm
Art.-No. **6050** • 187,- Euro
page 226

Target in U-Frame
Art.-No **6179** • 189,- Euro
page 228

U-Frame with ball mount Ø1.5“
Art.-No. **6178** • 168,- Euro
page 228

L-Prism with magnetic base

Prism on L-Holder
various designs
page 233

Magnetic base for L-prism
Art.-No. **1075** • 40,- Euro
page 234

M8 centering plate Ø40 mm
Art.-No. **6150.40** • 24,- Euro
page 238

Centering plate Ø40 mm
Art.-No. **6009** • 12,- Euro
page 83

M8 centering plate Ø40 mm
Art.-Nro. **6150.40** • 24,- Euro
page 238

Ball prism Ø1.5“
various designs
page 72

Targets with hemisphere mount
74,- Euro
page 232

Adapter 5/8“ - M8
Art.-No. **0383.0897**
• 28,- Euro

Adapter 5/8“a - M8
Art.-No. **0385.0662**
• 28,- Euro

Tribrach claw adapter 5/8“
Art.-No. **3452** • 48,- Euro
page 254

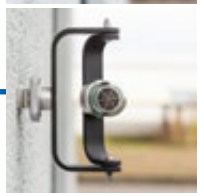
Applications in free space: Examples, s. page 242

wall bolts
page 100

Perforated plate
page 101

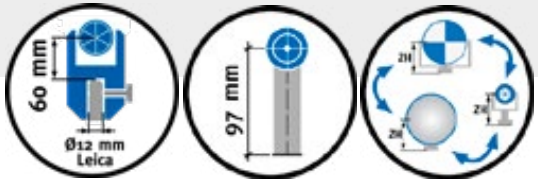
M8 centering plate Ø40 mm
Art.-No. **6150.40** • 24,- Euro
page 238

Centering plate Ø40 mm
Art.-No. **6009** • 12,- Euro
page 83



prices do not include any taxes

TLS - Quick Change System Leica 60 mm, magnetic ZH = 97/100 mm



100 mm (with M8 centering plate)

97 mm

60 mm

86 mm

3 mm

Scanning sphere Ø145 mm
various designs
page 224

Target, rigid, Leica
Art.-No **6183** • 142,- Euro
page 230

Target, tiltable, Leica
Art.-No. **6184** • 194,- Euro
page 231

U-Frame with ball mount Ø1.5“., Leica
Art.-No. **6185** • 173,- Euro
page 232

L-Prism, Leica-Mount
various designs
page 90

Leica prisms

HIP Prisms Leica
various designs
page 25

Ball prism Ø1.5“
various designs
page 72

Targets with hemisphere mount
74,- Euro
page 232

6180.R

6180

Magnetic base Ø40, Leica
Art.-No. **6008.M40** • 41,- Euro
page 239

Magnetic base Ø40 mm, M8
Art.-No. **6005.M40** • 34,- Euro
page 225

M8 centering plate Ø40 mm
Art.-No. **6150.40** • 24,- Euro
page 238

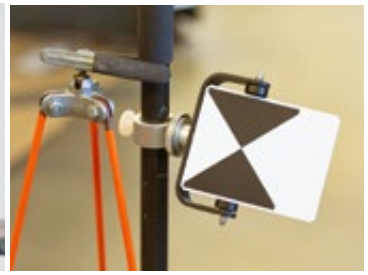
WA Leica Adapter, M8
Art.-No. **0830** • 18,- Euro
page 51

100 mm

M8 centering plate Ø40 mm
Art.-No. **6150.40** • 24,- Euro
page 238

Applications in free space: Examples, s. page 242






prices do not include any taxes

TLS - Quick change system, Leica ZH = 160 mm, magnetic ZH = 197/200 mm

Scanning sphere, Flex
Art.-No. **6056.1** • 231,- Euro
page 222

Ø200 mm

Ø270 mm

Target in U-Frame
various designs
page 235

Leica original prisms

HIP Prism Leica
various designs
page 24

Adapter Leica - M8
Art.-No. **0302.060** • 33,- Euro
page 222

Adapter Leica - Leica
Art.-No. **0304.100** • 38,- Euro

200 mm (with M8 centering plate)

197 mm

160 mm

186 mm

200 mm

27 mm

10

3 mm

Ø 40 mm

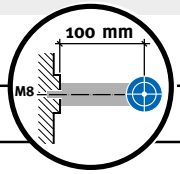
Magnetic base Ø40, Leica
Art.-No. **6008.M40** • 41,- Euro
page 239

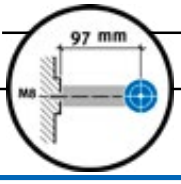
M8 centering plate Ø40 mm
Art.-No. **6150.40** • 24,- Euro
page 238

WA Leica Adapter M8
Art.-No. **0830** • 18,- Euro
page 51

Applications in free space

prices do not include any taxes





3 mm

Magnet-Base M8 for Scanning Ball Ø 145mm
Ø33 mm Art.-No. **6005.M33** • 34,- Euro
Ø40 mm Art.-No. **6005.M40** • 34,- Euro

Laserscanning Spheres
s. page 224

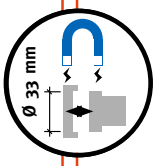
L-Carrier for Bo 360° Prism
Ø33 mm Art.-No. **5678.M33** • 93,- Euro
Ø40 mm Art.-No. **5678.M40** • 93,- Euro

Bo 360° Prism
s. page 40

L-Carrier for Leica GRZ 101 Prism
Ø33 mm Art.-No. **5688.M33** • 104,- Euro
Ø40 mm Art.-No. **5688.M40** • 104,- Euro

360° Prism Leica Mini
s. page 45

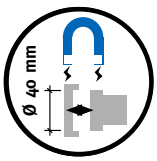
M8 wall bolts
s. page 100



M8 cent. plate Ø 33
Art.-No. **6150.33**
s. page 100

M8 precision bolts
s. page 102

M8- cent. plate Ø 40
Art.-No. **6150.40**
s. page 100



Perforated plate „fix point“
s. page 101

Magnet-Base for ball prism thread base
Ø33 mm Art.-No. **6011.M33i** • 30,- Euro
Ø40 mm Art.-No. **6011.M40i** • 30,- Euro

M8 thread base for Ø30 mm
Art.-No. **1465.08a** • 42,- Euro
s. page 76

Ball prisms Ø30 mm
s. page 71

M8 thread base for Ø1.5“
Art.-No. **1466.08a** • 52,- Euro
s. page 76

Ball prisms Ø1.5“
s. page 72

TLS Target
Art.-No. **6155**
s. page 236

Magnet-Base with 5/8“ thread
Ø33 mm Art.-No. **6007.M33** • 30,- Euro
Ø40 mm Art.-No. **6007.M40** • 30,- Euro

5/8“ HIP-U prism
s. page 23

5/8“ HIP-U Prism
s. page 25

Magnet-Base with Leica-Spigot
Ø33 mm Art.-No. **6008.M33** • 41,- Euro
Ø40 mm Art.-No. **6008.M40** • 41,- Euro

360° prism accessories
s. page 38

Laserscan targets pocket
s. page 219

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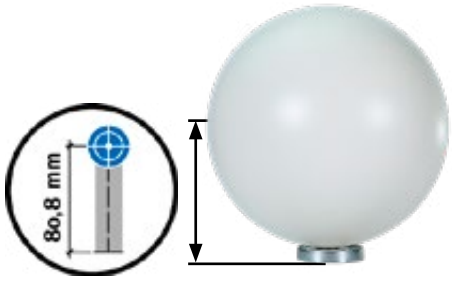
Laser scanning Sphere Ø 145 mm



For registration and georeferencing
Spheres can usually be scanned by all terrestrial laser scanners to be processed as a control or connection point. Optimal placement in the measuring range is therefore most important.

- Ø145 mm
- M8 inner thread
- With every sphere comes a magnet Ø40 x 8,3 mm and M8 x 13 mm outer thread
- Target height: 80.8 mm = 72.5 mm (ball radius) + 8.3 mm (height of magnet)

Model 1: Standard

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

Model 2: Flex

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

with M8 magnet
Ø40 x 8,3 mm

Single Scanning Sphere

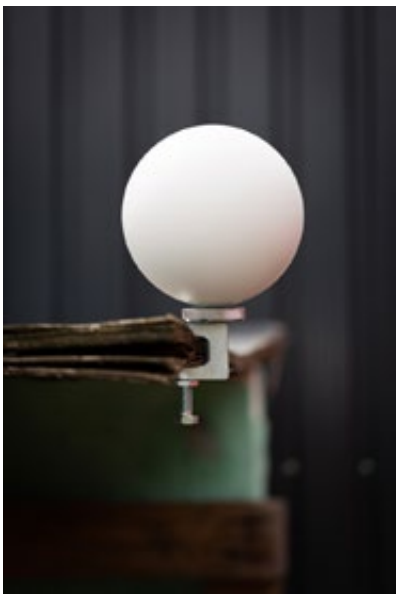
Description	Order-No.	Euro
Sphere **Standard**, Ø 145 mm, with M8 Standard magnet	**6000**	100,-
Sphere **Flex**, Ø 145 mm, with M8 Standard magnet	**6002**	134,-

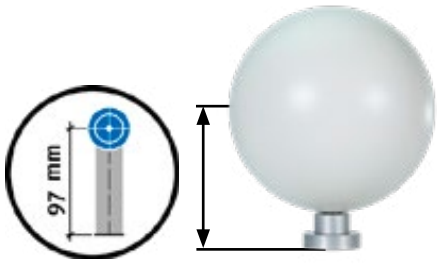
Set of 6 in transport case

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**	599,-
Set of 6 spheres **Flex**, Ø 145 mm, with 6 magnets	**6054**	839,-





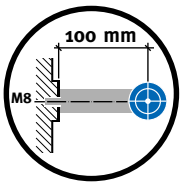
Magnetic base Ø40 mm for scanning shere Ø 145 mm

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

- Anodized aluminum, integrated permanent magnet, M8 external thread made of VA
- Magnetic base Ø 40 x 10 mm, holding force of the magnet approx. 5 Kg
- Effective height: 24,5 mm
- Target height ZH: 97 mm (from bottom of magnetic base to center of ball)

Description	Order-No.	Euro
Magnetic base Ø40 x 24,5 mm, M8 outer thread	**6005.M40**	34,-

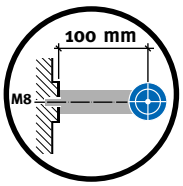
INFO When using prisms/target marks with target height ZH 97 mm in conjunction with centering plates No. 6150 (s. page 238) results in the target height of 100 mm according to AdV version (German standard) (s. page 7)



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,-



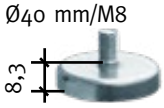
Scanning Sphere Segment

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).

with standard magnet(s) Ø40 mm/M8

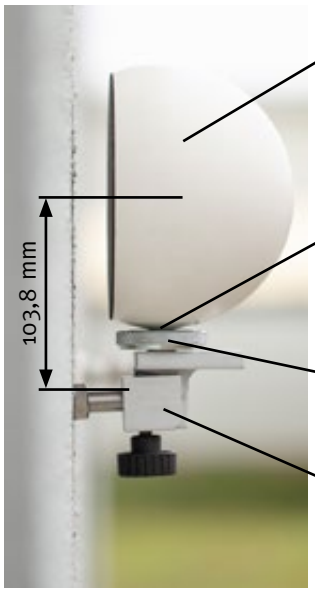


Description	Order-No.	Euro
Scanning Sphere **Segment**, Ø 145 mm, with Ø40, M8 magnet	**6050**	187,-

Description	Order-No.	Euro
6 pc. set **flex** sphere **segments**, Ø 145 mm, with M8 magnets	**6051**	1.154,-

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

Example: With standard magnets



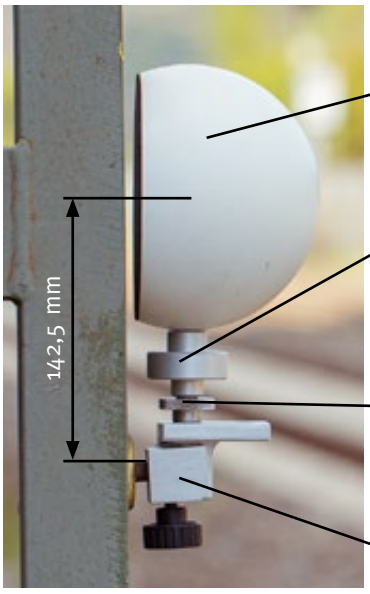
Scan Sphere Segment - Art.-No.: **6050**

Ø40 mm Standard Magnet **comes with every scanning sphere**

M8 centering plate Ø40 mm Art.-No.: **6150.40**
s. page 238

Bolt adapter with circular level Art.-No.: **0852**
s. page 164

Example: With Leica-Adapter



Scan Sphere Segment - Art.-No: **6050**

PRO Leica Adapter Art.-No.: **0680**
s. page 51

M8 / Leica spigot Art.-No.: **0830**
s. page 52

Bolt adapter with circular level Art.-No.: **0852**
s. page 164

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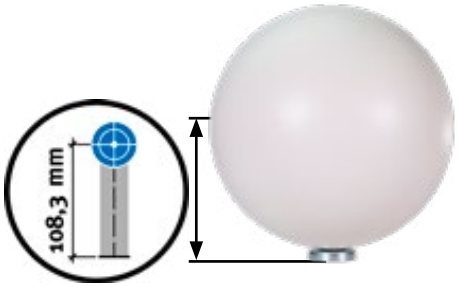
Scanning Sphere Ø200 mm



Standard magnet M8 (ZH = 108,3 mm)

For registration and georeferencing with laser scanner at long distances

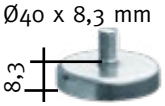
- Ø200 mm
- Flex design: plastic with shock-absorbing surface coating.
- Use and storage: -20° to + 50° C
- M8 inner thread
- 2 standard magnets Ø40 mm with M8 male threads of different lengths are supplied with each sphere
- Target height ZH with standard magnet: 108.3 mm

Single scanning sphere

Description	Order-No.	Euro
Scanning sphere **Flex** Ø200 mm, incl. standard magnet M8	**6056.1**	231,-

Set of 3 in transport case

incl. M8 magnet
Ø40 x 8,3 mm



Description	Order-No.	Euro
Set of 3 scan. sphere Flex Ø200 mm, with standard magnets	**6056**	725,-

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

Adapter Leica – M8 (ZH = 160 mm)

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

- Anodized aluminum Ø25 x 86 mm with mounting for Leica bolt
- Effective length from top of Leica bolt: 60 mm
- Horizontal screw with star grip to secure the ball
- Target height ZH to ball center: from top of Leicab bolt 160 mm =
- From underside of adapter 186 mm

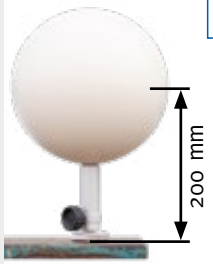
Description	Order-No.	Euro
Adapter Leica – M8, with locking screw	**0302.060**	35,-

Magnetic base – Leica Ø12 mm (ZH = 197 mm)

For use with magnetic quick-change system Ø40 mm

- Description - s. page 239
- Target height ZH to prism center from magnet bottom (with 6150.40): 197 mm

Description	Order-No.	Euro
Magnet base **Ø40 mm** with Leica bolts Ø12 x 27 mm	**6008.M40**	41,-



INFO When using a Ø200 mm scanning sphere (Nr. 6056.1) with adapter Leica-M8 (No. 0302.060), magetic base Ø40 mm (No. 6008.M40) and M8 centering plate (No. 6150.40) -s. page 238- a **target height ZH** of 200 mm results **overview** page 222

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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.

INFO Rotating the target around its vertical axis may be necessary for registering wide-ranging scans. With rigid targets, the Leica bolt should be vertical during this process; with **tiltable** targets, this is not necessary.

- Stable aluminum construction of outer bracket and target board axle
- Target plate: plane, weatherproof composite plate 118 x 108 mm
- Fully tiltable target plate
- Tilt resistance adjustable with open-end wrench SW8
- Magnetic base Ø40 mm, 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

Front side: For Laser Scanning

- Target sign: Checkerboard design diagonallly: 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 220

Target height ZH = 97 / 100 mm

s. page 221

Application in „open space“

s. page 242

Transport case

s. page 253

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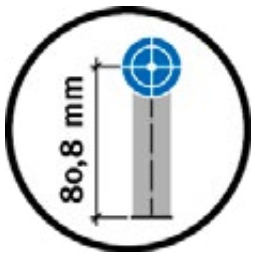
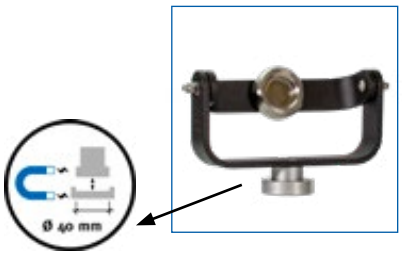


Target for Laser Scanners & Total Stations, ZH = 80,8 mm

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

On the U-shaped inner bracket there is a magnetic base on which either a scanning target for laser scanners or a spherical prism Ø1.5“ (38.1 mm) for total stations can be inserted. **High-precision matching of the two target centers**.
Due to the **gimbal suspension, perpendicular use is not necessary**. Target plate or ball prism can be aligned to any instrument standpoint even with an inclined standing axis, whereby the 3D position of the target center remains unchanged.

- Sturdy aluminum construction of inner and outer bracket
- Cardanically suspended magnetic base for ball Ø 1.5“ (38.1 mm).
  Holding force of ball mount: Around 2 kg.
- Tilt resistance adjustable with open-end wrench SW8
- **Magnet base Ø 40 mm, holding force of base magnet approx. 5 kg**
- Target height ZH (tilt axis height): 80.8 mm from bottom of magnetic base to target center



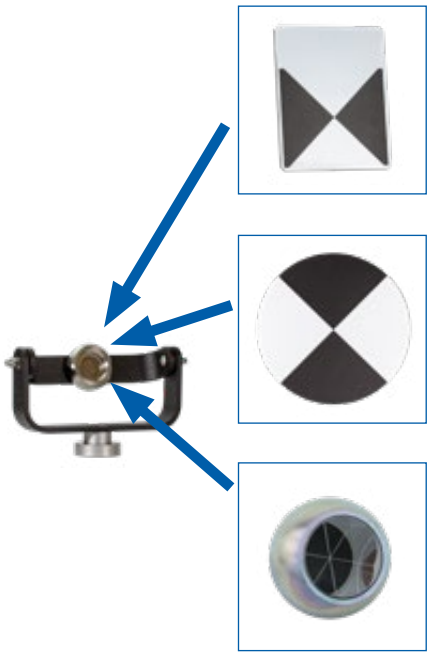
Description	Order-No.	Euro
Target Pocket *, ZH= 80,8 mm, magnet base Ø40 mm, magnet base for ball-Ø 1.5”, **holding force ball: 2 kg**	**6178**	168,-

*) **without** ball prism and scanning target

Target for laser scanning with ball connection Ø1.5“ (38,1 mm)

Target plate suitable for laser scanners at short to medium distances.

- Plane, weatherproof composite panel 150 x 118 mm
- At back galvanized steel hemisphere Ø 1.5“ (38.1 mm)
- Target: checkerboard design 112 x 102 mm (diagonal: 150 mm = 6“)
- Center of the target is exactly in tilt and standing axis of the carrier
- Labeling field approx. 40 mm high



Description	Order-No.	Euro
Target 150 x 118 mm, with hemisphere Ø1.5“ connection	**6180**	74,-

Like 6180 above, but:
- Circular shape Ø108 mm (4.25“)
- Without space for labeling

Description	Order-No.	Euro
Target Ø108 mm, with hemisphere Ø1.5“ connection	**6180.R**	74,-

Ball prisms Ø1.5“ (38,1 mm) for total station measurements

Available with prism constant K = -11.3 mm and -16.9 mm
s. page 72





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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

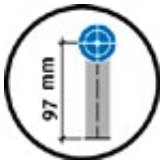
Front side: For laser scanners

- 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 221

Application in „open space“

s. page 242

Transport case

s. page 253

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prices do not include any taxes

Target for Laser Scanners & Total Stations, ZH = 60 mm

Titlable target with Leica bolt quick connection Ø12 mm

Target suitable for laser scanners and total stations at short to medium distances. Due to the gimbal suspension, perpendicular use is not necessary. The target plate can always be aligned to any instrument standpoint, with complete positional identity of the center.

INFO For rigid, non-tiltable target plates, the Leica bolt should be approximately vertical. For tiltable target plates in the U-shaped beam, its position is not important.

- Stable aluminum construction of inner and outer bracket
- Target plate: Plane, weatherproof composite plate 118 x 108 mm
- Tiltable target plate, fully tiltable
- Tilt resistance adjustable with open-end wrench SW8
- Leica quick connector with push button, for all Leica bolts Ø12 mm
- Target height ZH (tilt axis height): from bottom 86 mm / from top of Leica bolt 60 mm.

Front side: For Laser scanning

- Target: Checkerboard design, diagonal: 150 mm = 6“.
- Center of the target is exactly in standing and tilting axis of the carrier

Back side: For total station measurements

- Target: Red-yellow reflective foil Ø45 mm with crosshairs.
- Prism constant K = +3 (Leica +37.4) mm

Description	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 221

Application in „open space“

s. page 242

Transport case

s. page 253

Laser Scanning/Total Station Target, ZH = 60 mm

With magnetic base for switch between scanning target and ball prism, with Leica quick connector Ø12 mm

On the U-shaped inner bracket there is a magnetic base on which either a scanning target for laser scanners or a spherical prism 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.

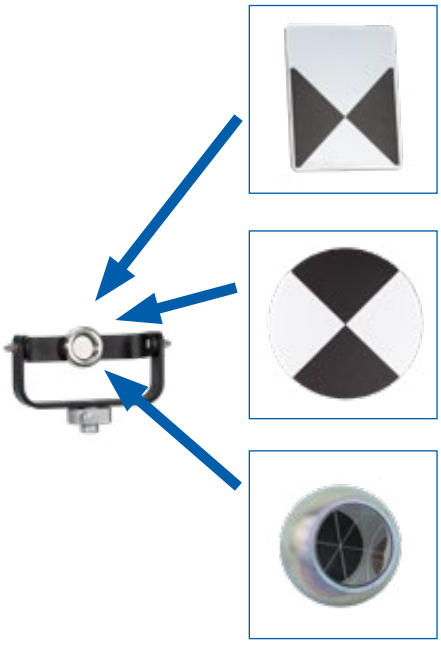
- Sturdy aluminum construction of inner and outer bracket
- Cardanically suspended magnetic base for ball Ø 1.5“ (38.1 mm)
  Holding force of ball mount: Around 2 kg.
- Tilt resistance adjustable with open-end wrench SW8
- Magnet base Ø 40 mm, holding force of magnet approx. 2 kg
- Target height ZH (tilt axis): From bottom 86 mm / from top Leica bolt: 60 mm

Description	Order-No.	Euro
Laserscan Target Pocket *, ZH= 60 mm, Leica-Anschluss Ø12 mm, Magnetbasis für Kugel-Ø 1.5”, Haltekraft 2 kg	**6185**	173,-

*) **without** ball prism and scanning target

Target for laser scanning with ball connection Ø1.5“ (38,1 mm)

Target plate suitable for laser scanners at short to medium distances.



- Plane, weatherproof composite panel 150 x 118 mm
- At back galvanized steel hemisphere Ø 1.5“ (38.1 mm)
- Target: checkerboard design 112 x 102 mm (diagonal: 150 mm = 6“)
- Center of the target is exactly in tilt and standing axis of the carrier
- Labeling field approx. 40 mm high

Description	Order-No.	Euro
Target 150 x 118 mm, with hemisphere Ø1.5“ connection	**6180**	74,-

Like 6180 above, but:
- Circular shape Ø108 mm (4.25“)
- Without space for labeling

Description	Order-No.	Euro
Target Ø108 mm, with hemisphere Ø1.5“ connection	**6180.R**	74,-

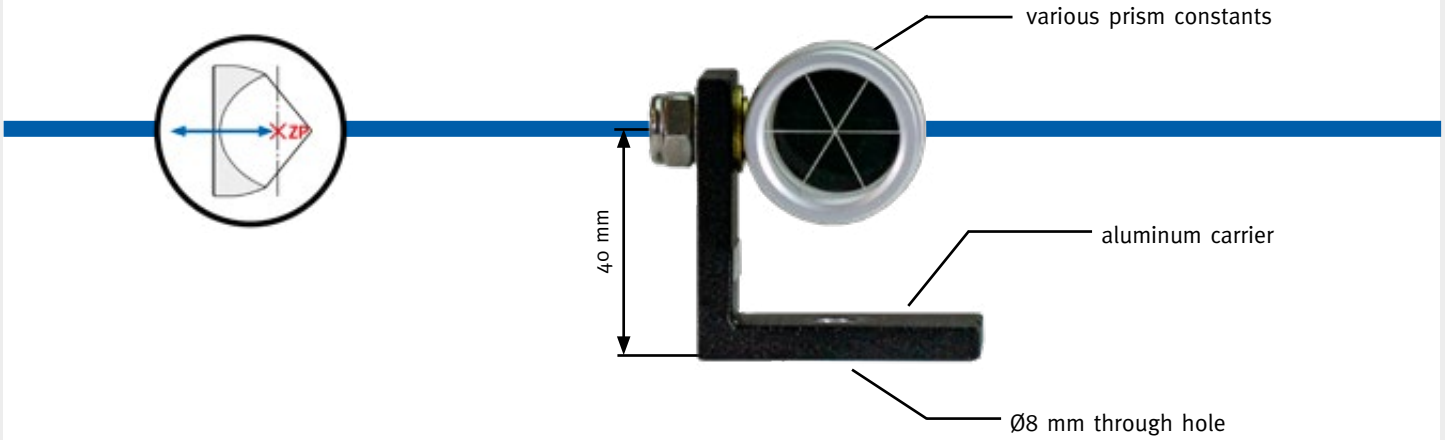
Ball prisms Ø1.5“ (38,1 mm) for total station measurements

Available with prism constant K = -11.3 mm and -16.9 mm
s. page 72

L-Prism

To screw on magnetic base (s. page 234)

- 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 100



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,-
	Ø 25 mm	**-16,9** (Leica = +17,5) mm	**1005.17**	113,-
		-30,0 (Leica = +4,4) mm	**1005.30**	166,-
		-34,4 (Leica = 0) mm	**1005.34**	166,-
		-35,0 (Leica = -0,6) mm	**1005.35**	166,-

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

Magnetic base for target heights 80,8 mm and 108,3 mm

s. page 234

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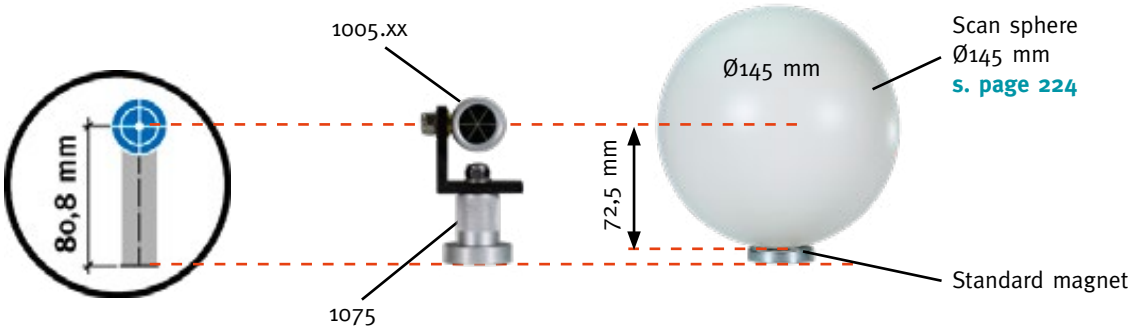
Magnetic base Ø40 mm for L-Prism, ZH = 80,8 mm

For use with prism on L-beam 1005.XX
The combination results in the system height 80.8 mm.

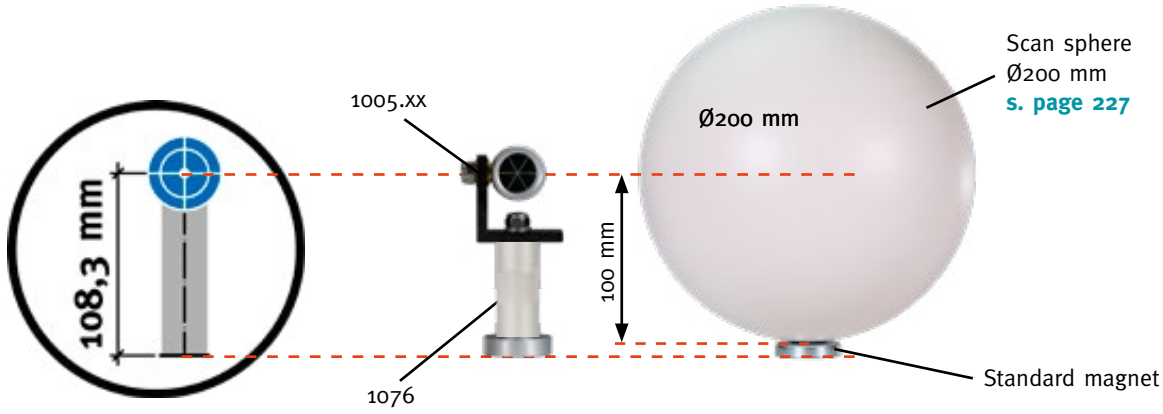


- Magnetic base Ø 40 mm, holding force of the magnet: approx. 5 Kg
- Effective height: 40.8 mm
- Target height ZH: 80.8 mm (from the bottom of base to the tilt axis of the prism)
- Cardanic suspension of the prism: The L-beam can be rotated axially on the magnetic base, the prism can be tilted (360° each)
- Rotation and tilting resistance are adjustable with open-end wrench SW13
- Magnetic base and L-prism are supplied as an assembled unit

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

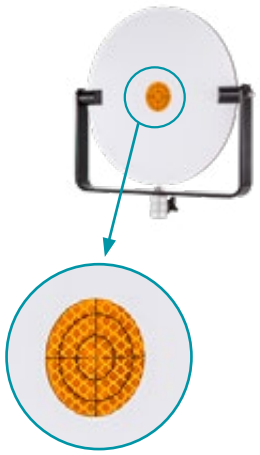
Magnetic base Ø40 mm for L-Prism, ZH = 108,3 mm

For use with prism on L-beam 1005.XX
The combination results in the system height 108.3 mm.



- Magnetic base Ø 40 mm, holding force of the magnet: approx. 5 Kg
- Effective height: 68.3 mm
- Target height ZH: 108.3 mm (from the bottom of base to the tilt axis of the prism)
- Cardanic suspension of the prism: The L-beam can be rotated axially on the magnetic base, the prism can be tilted (360° each)
- Rotation and tilting resistance are adjustable with open-end wrench SW13
- Magnetic base and L-prism are supplied as an assembled unit

Description	Order-No.	Euro
Magnetic base Ø 40 x 68.3 mm for L-prism	**1076**	44,-

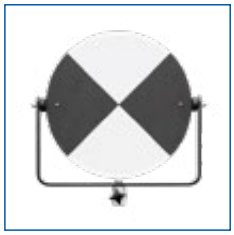


Circular target Ø 270 mm for laser scanning & total station in U-beam, Leica connection

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



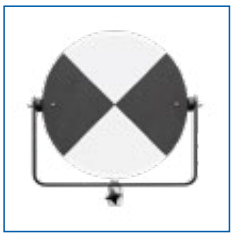
Description	Order-No.	Euro
Laserscan circular target, tiltable, ZH= 160 mm, Leica bolt connection, checkerboard design, reflective foil on back	**6154**	236,-

Hemisphere on back side Ø1.5“

Target with dual fuction when **laser scanning**:

1. Use on U-Beam with Leica connection as no. 6154 (see above)

2. Use with magnet base, like article no. 6155 (s. page 236)
- Magnetic hemisphere Ø1.5“
- Identical center of checkerboard target and hemisphere
- U-beam remains on circular target board, without functio



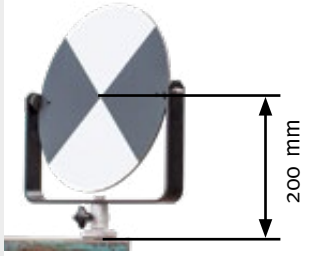
Description	Order-No.	Euro
Laserscan circular target, tiltable, ZH= 160 mm, Leica bolt connection, checkerboard design, hemisphere 1.5“ on back	**6154.B**	236,-

Magnetic base – Leica Ø12 mm (ZH 197 mm)

For use with magnetic quick-change system Ø40 mm

- Description - s. page 239
- Target height ZH to target board center from bottom of magnetic base: 197 mm

Description	Order-No.	Euro
Magnetic base Ø40 mm with Leica spigot Ø12 x 27 mm	**6008.M40**	41,-



INFO

When using the target Ø270 mm (No. 6154) with magnetic base Ø40 mm (No. 6008.M40) and M8 centering plate (No. 6150.40) -s. page 238- a **target height ZH of 200 mm results**
Overview s. page 222

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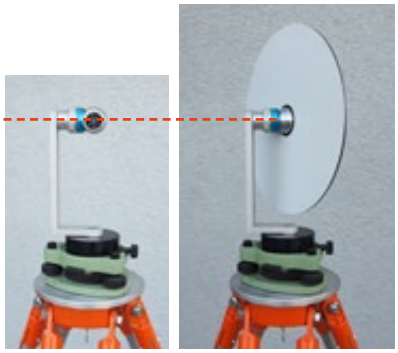


Circular Target with centric ball connection

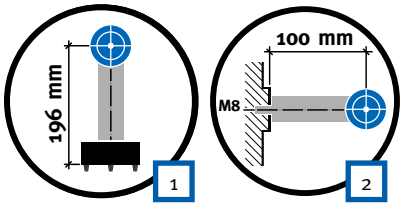
For registration and georeferencing in terrestrial laser scanning

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.

With adapters, you can reach common surveying offsets:

- 100 mm offset from M8 wall bolts [1]
- 196 mm target height with the instrument holders tribrach [2]



INFO The center of the circular target / prism is always identical to the system point. So no eccentricities must be considered.

Circular Tartget with checkerboard design

- Torsionally rigid aluminum composite plate Ø 270 mm
- Weatherproof
- Temperature for use and storage: -10° to 50°
- To use with magnetic ball base
- Centric hemisphere Ø 1.5" (38,1 mm), galvanized
- Tilting range: ± 35°

Description	Order-No.	Euro
circular target Ø 270 mm, checkerboard design, **hemisphere Ø 1.5"** in target center	**6155**	125,-

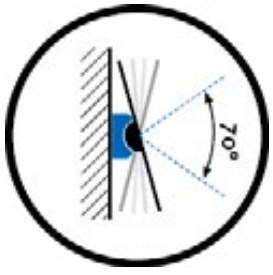
Ball base Ø 1.5“ with magnet & M8-thread

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

Description	Order-No.	Euro
magnet. base, M8 outer thread, holding force 6 kg (s. page 76)	**1466.08a**	52,-

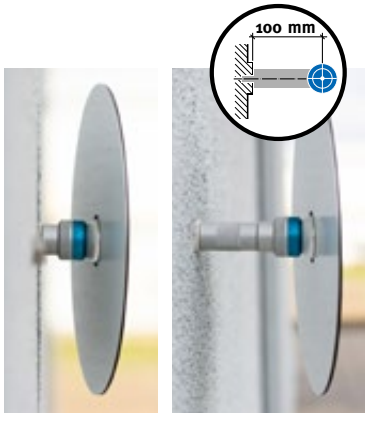
INFO If you‘d like to use a **semisphere Ø30 mm** connection, please use the following numbers to order: 1465.208a (base) and 6150 (circular target).



To use with M8 wall bolts

- Direct screwing into the M8 inner thread of the wall bolt
- Distance 50 mm from wall stud to ball/target center [Fig. 1].
- With adapter (see page 77) Distance 100 mm from wall bolt to ball/target center [Fig. 2].
- Overview s. page 7

Wall bolts see page 100



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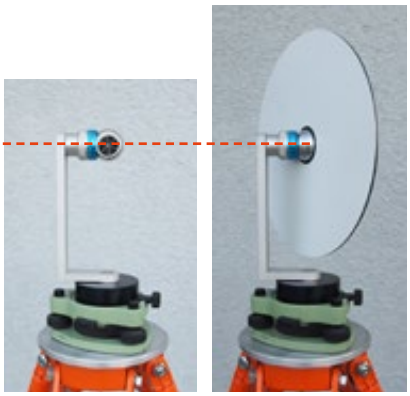


Circular targets with L-brackets

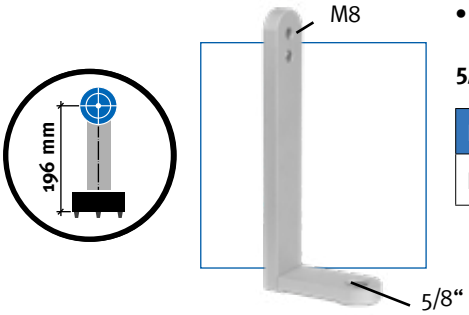
For use with ball base and ball prism / circular target

The center of the ball prism and the circular target is identical. It lies exactly in the tribrach axis. Existing coordinates of the prism pole position point can thus be used for the tachymetric measurement with the ball prism or for the laser scanning with the circular target. Ball prism and circular target can be exchanged within seconds; force-centered and highly precise.

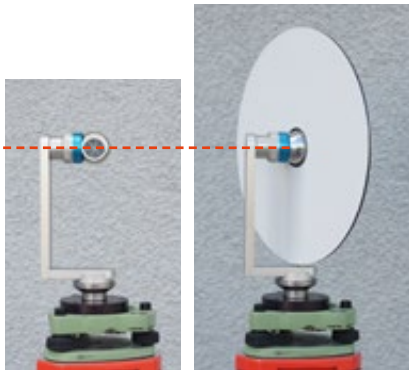
L-Carrier with 5/8“ inner thread

- M8 inner thread to screw-in the ball base (s. page 236)
- Stable and precise construction made of anodised aluminum

5/8" inner thread to screw onto tribrach inserts or prism poles.



Description	Order-No.	Euro
L-bracket, 5/8" inner thread for tribrachs for ball bases	**6170**	84,-

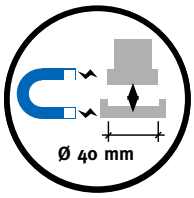


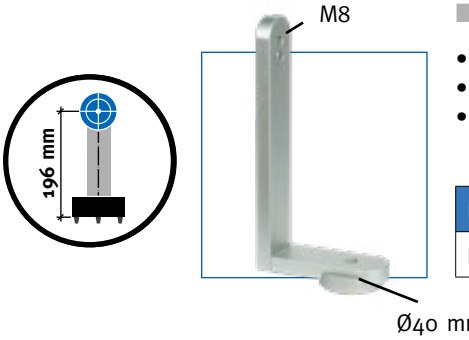
Magnetic quick-change adapter

The L-bracket is freely rotatable 360 ° around the circular target around the vertical axis. The center of the printed target remains unchanged in its location.
The integrated magnet of the L-brackets base holds itself and the circular target secure on the adapter. The centering accuracy of the magnetic base is +- 0,1 mm. Due to the additional possibility of tilting the circular target (which is also magnetically held) it can be optimally aligned to any instrument position. The permanent magnets allow a very fast attachment or removal of the L-bracket or the target plate.

L-Carrier with magnetic base Ø 40 mm

- Stable and precise construction made of anodised aluminum
- M8-Innengewinde zum Einschrauben der Kugelbasis (s. Seite 236)
- Holding force magnet: approx. 5 kg

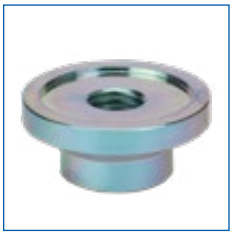




Description	Order-No.	Euro
L-bracket, **magnetic base Ø 40 mm**, with M8 inner thread	**6160.M40**	95,-

Quick-change adapter: 5/8"inner thread – Ø 40 mm

- Adapter to screw-in / out, with forced centering
- Bottom: 5/8" inner thread
- Top: centering for magnetic base Ø 40 mm
- Centering accuracy ± 0,1 mm
- Galvanized steel, magentic
- Effective length: 20,5 mm



Description	Order-No.	Euro
Centering adapter 5/8" – **Ø 40 mm**	**6162.40**	27,-

Magnetic Quick Change System
M8-Centering-Plate

- Exchange of different targets/prisms within seconds
- Full metal materials: Anodized aluminium, galvanized steel, stainless steel V2A
- Robust and weatherproof
- High-precision forced centring

How it works

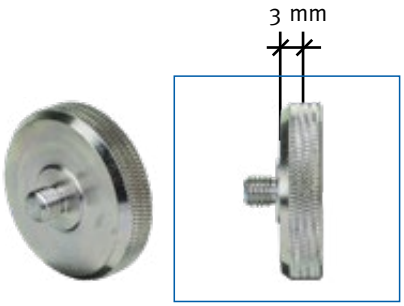
A centering plate with M8 external thread is screwed into the wall bolts with M8 internal thread. A tool is not necessary here.

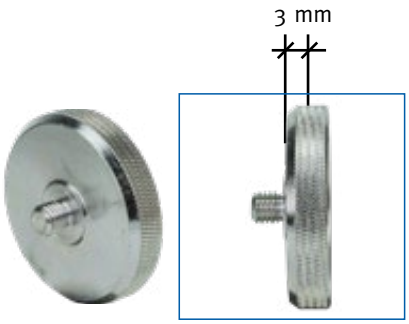
The targets (reflectors, prisms, scan balls, target plates, etc.) are equipped with a cylindrical base with integrated permanent magnet, the length of which is adapted to the distance of 100 mm from the wall bolt to the center of the target.

The targets stick securely and force-centered in the centering plate with an repeat accuracy of ± 0.1 mm.

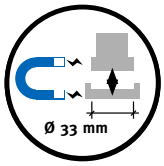
M8 Centering Plate

- Outer thread M8 x 8 mm
- Galvanized steel
- Knurled grip for tool-free screwing into M8 wall bolts
- Effective length 3 mm





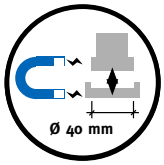
M8 centering plate Ø 33 mm



- Centering Ø 33 mm to mount bases with integrated magnets
- Outer-Ø 43 mm

Description	Order-No.	Euro
M8 centering plate Ø 33 mm, effective length 3 mm	**6150.33**	23,-

M8 centering plate Ø 40 mm



- Centering Ø 40 mm to mount bases with integrated magnets
- Outer-Ø 50 mm

Description	Order-No.	Euro
M8 centering plate Ø 40 mm, effective length 3 mm	**6150.40**	24,-

Applied target heights

Target height ZH 80,8 mm

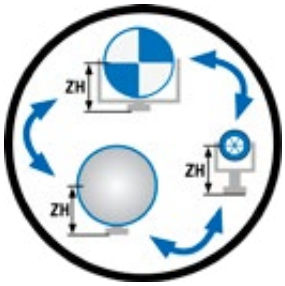
s. page 220

Target height ZH 97 / 100 mm

s. page 221

Target height ZH 197 / 200 mm

s. page 222



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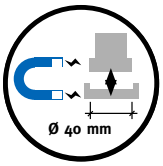
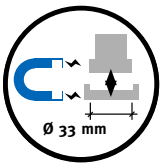
Magnetic base - Leica Ø12 mm

For tiltable reflector holders with Leica connection Ø12 mm

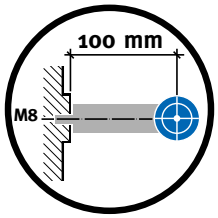
- Cylindrical base with integrated magnet
- Magnet holding force approx. 5 kg
- Leica bolt Ø12 x 27 mm, stainless steel
- Anodized aluminum
- Total length = 37 mm
- Centering accuracy in conjunction with M8 centering plates: +-0.1 mm

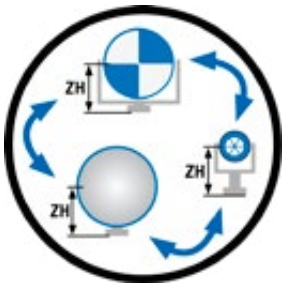




Description	Order-No.	Euro
Magnetic base **Ø40 mm** with Leica bolt Ø12 x 27 mm	**6008.M40**	41,-
Magnetic base **Ø33 mm** with Leica bolt Ø12 x 27 mm	**6008.M33**	41,-

INFO For laser scanning applications the Ø40 mm is well established.
Centeirng plates Ø40 mm s. page 238 (also: Plates with Ø33 mm).





TLS quick change system s. page 218

Magnetic Quick Change System

196 mm

page 40 · page 31 · page 23 · page 22 · page 224 · page 25 · page 24 · page 231 · Ø270 mm page 72 · page <AE> · page 22 · page 23 · page 31 · page 40

1/4"a · Ø145 mm · Ø1.5" · 1/4"a

Adapter 5/8"i - 1/4"a
Art.-No. **5676** • 37,- €
page 40

5/8"i · 5/8"a · M8a · Leica Ø 12 mm · M8i · M8i · M8i · M8i · 5/8"a · 5/8"a

ball base Ø1.5", M8 thread
Art.-No. **1466.08a** • 52,- €
page 236

Adapter 5/8"i - 1/4"a
Art.-No. **5676** • 37,- €
page 40

Adapter magnetic base
Art.-No. **6164.100** • 37,- €

Adapter magentic base
Art.-No. **6164.50** • 40,- €

Adapter magnetic base
Art.-No. **6015.M40** • 37,- €

Adapter magnetic base
Art.-No. **6166.M40** • 42,- €

L-bracket with magnetic base
Art.-No. **6160.M40** • 95,- €
page 237

Adapter with magnetic base
Art.-No. **6162.M40** • 37,- €

Adapter 5/8" - M8i
Art.-No. **0383.1235** • 30,- €

L-bracket with 5/8"-thread
Art.-No. **6170** • 84,- €
page 237

Adapter 5/8"i - 5/8"a
Art.-No. **0300.114** • 30,- €

Adapter 5/8"i - 5/8"a
Art.-No. **0300.064** • 28,- €

Ø 40a · Ø 40i · 5/8"i · 5/8"i · 5/8"i

Ø 40 mm

Adapter 5/8" - Ø40 mm
Art.-Nr. **6162.40** • 27,- €
page 237

Leica spigot
see page 254

Tribrach insert, Leica
Art.-No. **3463.S** • 81,- €
page 254

22,5 mm · 5/8"a

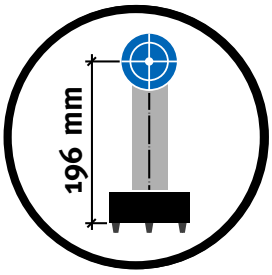
Tribrach insert, not turnable
Art.-No. **3452** • 48,- €
page 254

32 mm · 5/8"a

Tribrach insert, turnable
Art.-No. **3455** • 109,- €
page 254

196 mm

prices do not include any taxes

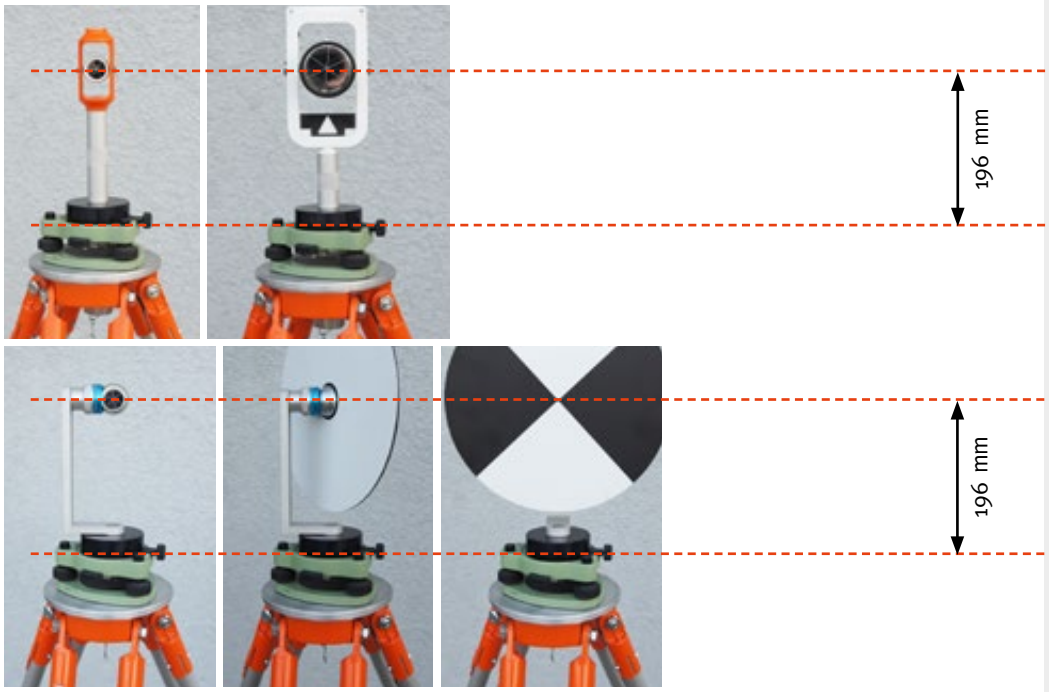


Tilting Axis Height 196 mm

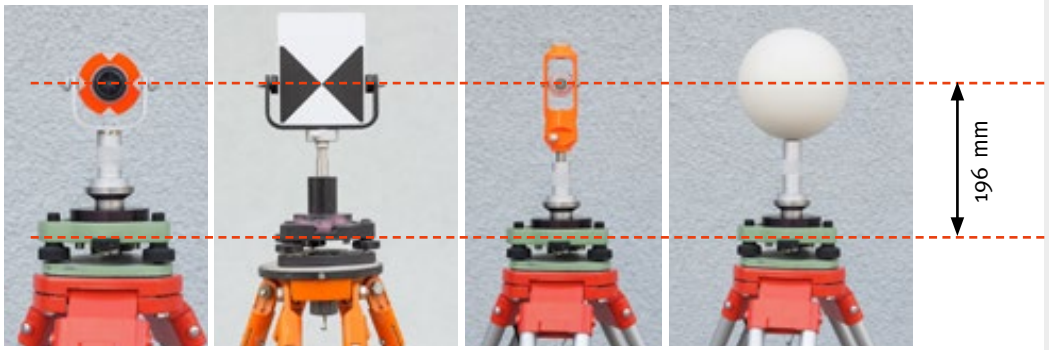
Various adapters in use

INFO We are happy to help you in choosing the right adapter. An overview of all available adapters can be found on page 240.

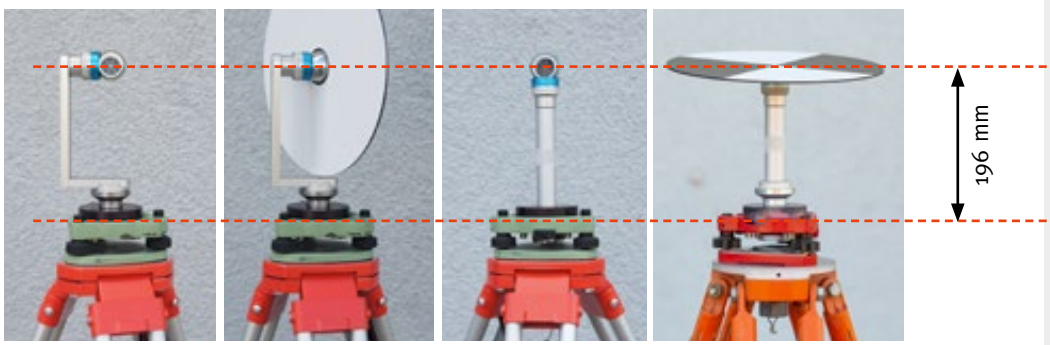
- claw tribrach 5/8“, with height 32 mm s. page 254



- claw tribrach 5/8“, with height 22,5 mm s. page 254 + magnetic base Ø40 mm s. page 237



- claw tribrach 5/8“, with height 22,5 mm + magnetic base Ø40 mm s. page 237



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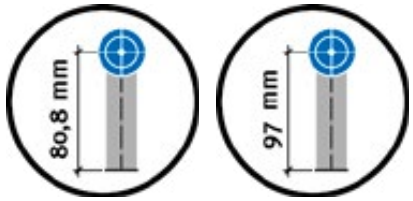
TLS - Leica / Quick change system, in „open space“



Centering plate Ø40 mm
Art.-No. **6009** • 12,- Euro
page 83

M8 centering plate Ø40 mm
Art.-No. **6150.40** • 24,- Euro
page 238

WA Leica Adapter, M8
Art.-No. **0830** • 18,- Euro
page 51

M8 Adapter Ø25 x 70 mm
Art.-No. **0373.070** • 25,- Euro

Suction holder M8
Art.-No. **5938** • 80,- Euro
page 117

Switchable Magnet M8
Art.-No. **5930** • 37,- Euro
page 115

Triangle plate M8
Art.-No. **6114.M8i** • 51,- Euro

Lever clamp M8
Art.-No. **5934** • 63,- Euro
page 116

Joint clamp M8
Art.-No. **6176.M8** • 44,-
page 243

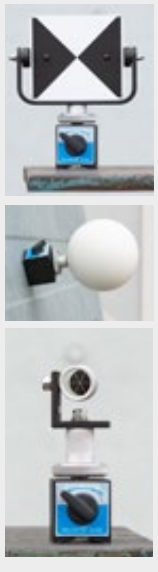
Strong M8 clamp
Art.-No. **6884** • 79,- Euro
page 267

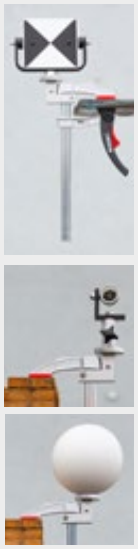
O-Ring-clamp
Art.-No. **2310** • 26,- Euro

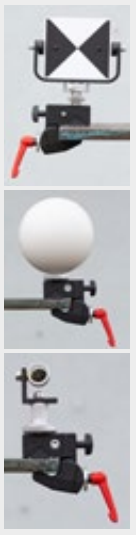
Pole clamp Ø18-32 mm
Art.-No. **2290.80** • 63,-

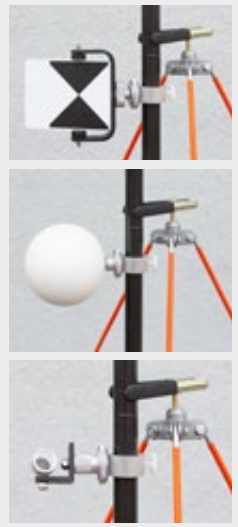
Mini Tripod M8
Art.-No. **6273** • 139,-
page 244

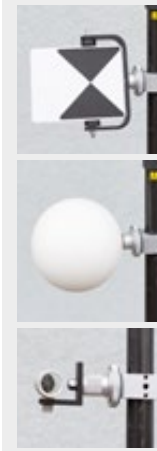
Joint clamp Leica
Art.-No. **6176.L** • 44,-
page 243

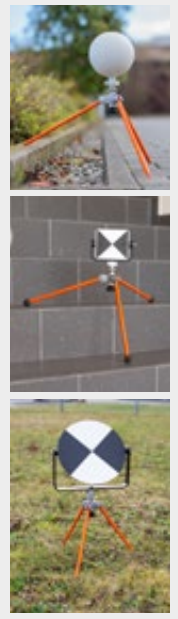


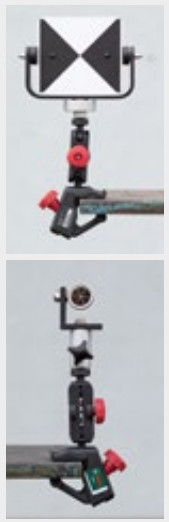












Universal Screw Joint Clamp

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

Leica M8 i

Description	Order-No.	Euro
Universal screw clamp with joint arm **M8 inner thread**	**6176.M8**	44,-
Universal screw clamp **Leica-Bolt Ø12 x 27 mm**	**6176.L**	44,-

Sturdy M8 screw clamp

Very robust metal alternative to this screw clamp you can find on page 267

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 59.

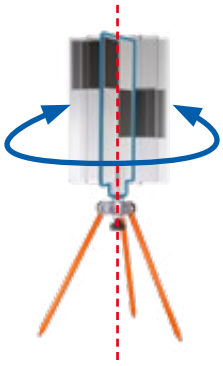

Universal tripod for laser scan targets

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

Natural ground

Smooth and sensitive surfaces



INFO Our Pocket Targets (page 219) 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

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prices do not include any taxes

Accessories & Adapters for Mini Tripod

Targets with 5/8" thread connection

Tiltable Ø270 mm Targets with Leica-socket
page 235

Pocket Targets with Leica-socket
page 231

Scanning Spheres with M8 inner thread
page 225

Tiltable Ø270 mm Targets with Leica-socket
page 235

Pocket Targets with Leica-socket
page 231

Scanning Spheres with M8 inner thread
page 225

Adapter M8 - 5/8", 7 mm
Art.-No. **0384.007** • 18,-
page 279

PRO Leica Adapter
Art.-No. **0690** • 50,-
page 280

Adapter WA Leica
Art.-No. **0830** • 18,-
page 280

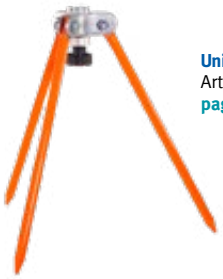
Leica-Spigot, magnet base
Art.-No. **6008.M40** • 41,-
page 239

Adapter M8a - M8a
Art.-No. **6005** • 16,-
page 225

Standard Magnet
Included with the laser scanning spheres

M8-centering plate Ø40
Art.-No. **6150.40** • 24,-
page 238

M8 Innengew.



Universal Tripod TALASCA PRO
Art.-No. **6273** • 139,-
page 244

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

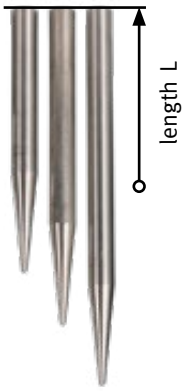
Description	Order-No.	Euro
Rubber ball to plug on (1 piece)	**5356.06**	3,20

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 238	**6150.40**	24,-

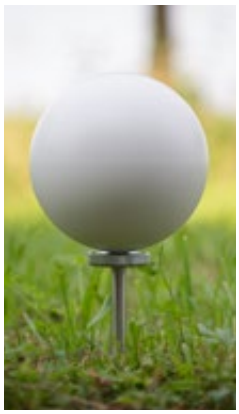


M8 stainless steel spikes

- Material: Ø12 mm stainless steel
- M8 inner thread

Description	length	Order-No.	Euro
stainless steel spike with **M8 inner** thread	120 mm	**1863.120**	18,-
	143 mm	**1863.143**	19,-
	170 mm	**1863.170**	20,-

Example with Pocket Target s. page 228



Example with Scan-Sphere: s. page 224

Example: Target Ø270 mm page 236 & Thread base M8 page 76

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 scanning with drones

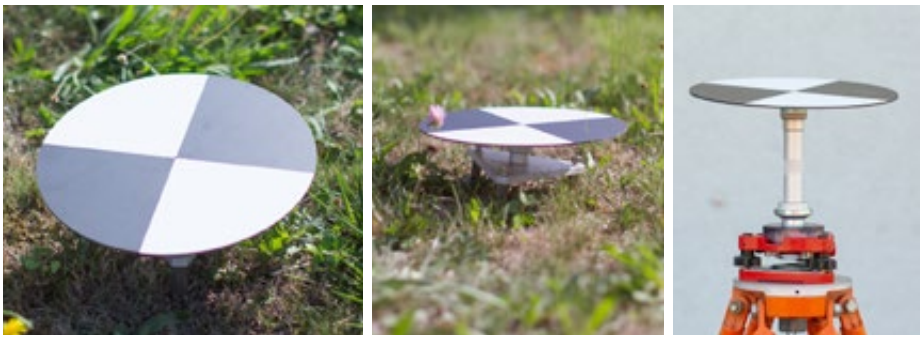
Many of our targets can also be used in drone scanning processes.

Tiltable targets

Targets in the U-beam can easily be aligned upwards.

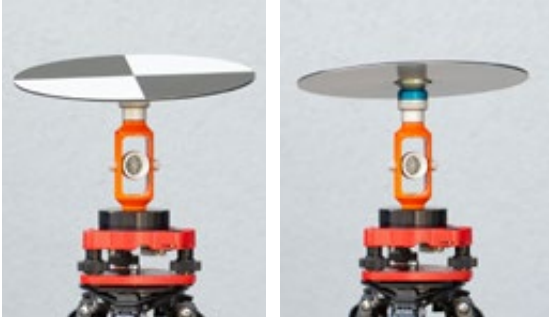
Circular targets with ball connection on back

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.
s. page 248



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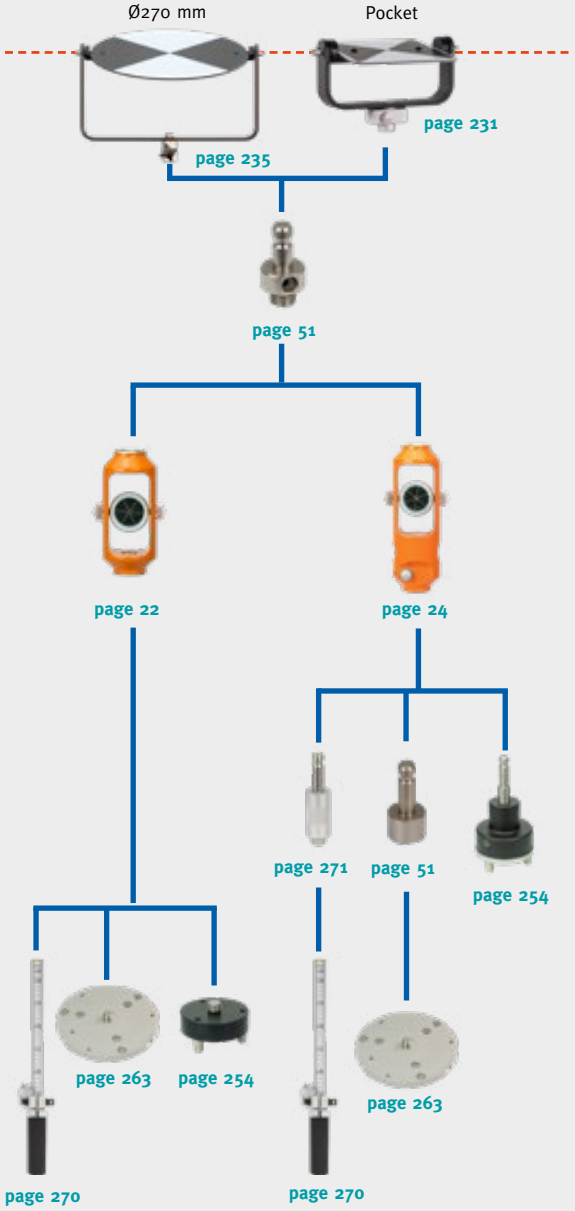
Laser Scanning: Linking drone scans and terrestrial measurements

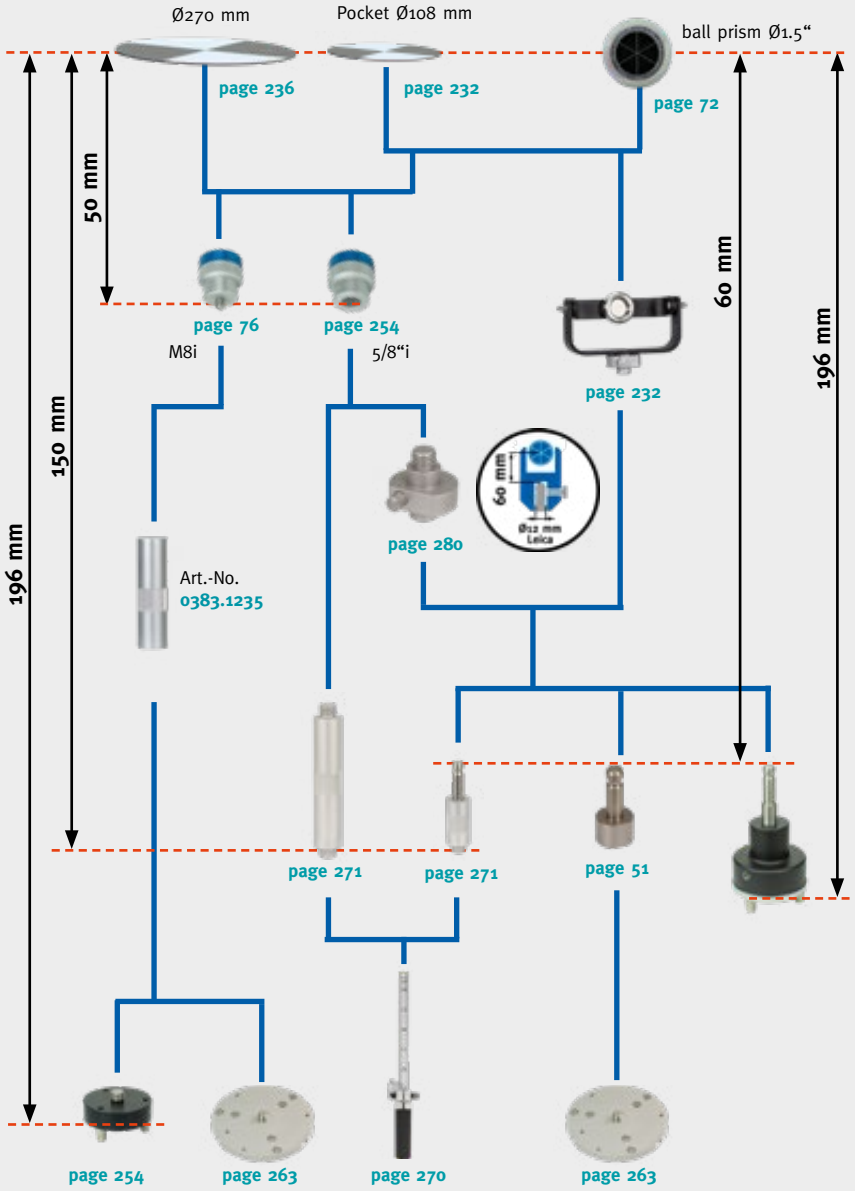
Prism below target in standing axis

(Target usable with drone and terrestrial)



Target and ball prism, magnetic quick change

(Target Ø270 mm in this combination can only be used with drone)



Square target on position coordinated point

coming soon

prices do not include any taxes

Tripod for Laser Scanners

Laser scanners are delivered with tripods for standard applications.
For exceptional conditions special accessories are required. Such as our **Mini Instrument Tripod**. This allows measurements to be carried out even in confined spaces. It can also be attached to a wide variety of objects and vertical surfaces. Targets such as scanning spheres and scanning targets can also be used on the Mini tripod.

Laser Scanner Examples

Example:
Leica BLK360
(with Leicas BLK360 tripod adapter)

Brand-owned quick change systems

Brand-owned adapter plates

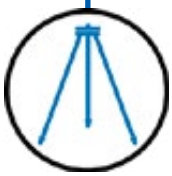
INFO Laser scanners are often equipped with a 3/8“ thread or a bolt quick release. An adapter to the standard 5/8“ thread is required here.

3/8“

Adapter plate 5/8“ to 3/8“ outer
Art.-No. **3035.1** • 44,- Euro
page 212

5/8“

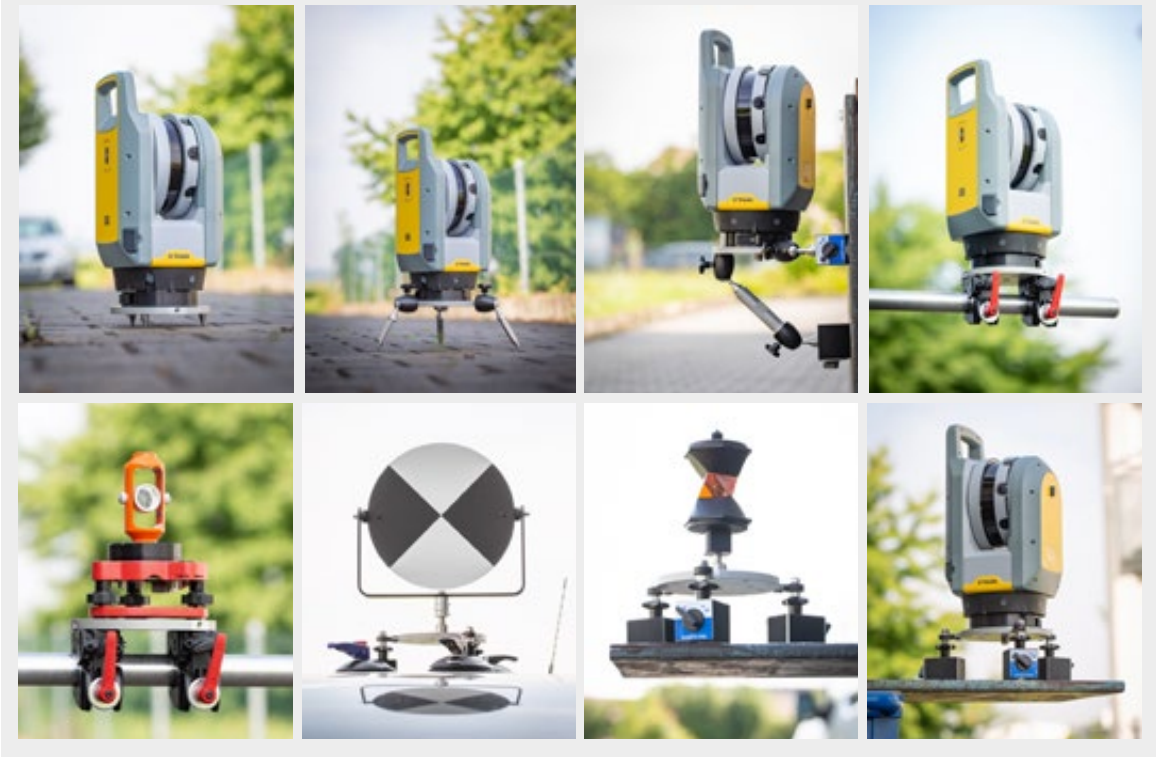
5/8“



Surveying tripod with 5/8“

5/8“

Instrumenten Tripod Mini „Base“
+ various tripod feet / applications
page 263



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General Surveying Accessories

Page 1 of 2


















General Surveying Accessories

Page 2 of 2

J.5 Holder for Laser Distance Meters (DISTOS) page 276

Instrument Tripod

- Length when pushed together: 1,12 m
- Weight: 6,7 kg

Description	Material	Clamping	Order-No.	Euro
NEDO Tripod	Alu	eccentric clamping	**200524P**	172,-

INFO This is our most popular instrument tripod. However, we can also supply numerous other models on request.

Tripod star for Measurements indoors

The tripod star was specially developed for measurements on smooth surfaces or indoors. There it is also suitable for the use of motorized tachymeters and laser scanners, if no special tripod is to be purchased.

- Borehole (1x per leg) for mounting the tripod feet
- Secure the tripod feet with rubber bands. The length of these can be adjusted so all common tripod types can be used
- The single tripod foot lies optimally between 2 hard rubber buffers. This guarantees a shake-free stand and prevents the tripod from slipping
- Foldable for transport
- Side length: 51 cm, therefore diameter of the installation circle: 102 cm
- Weight: 900 g

Description	Order-No.	Euro
Tripod star, with 3 rubber bands and 6 hard rubber buffers	**1975**	80,-

Tripod-Leg Shoes

- Can be used with all instrument tripods
- Mounting with variable rubber cords
- Centric mounting of the tripod-leg shoe with even distribution of the weight on the tripod foot plates
- Automatic levelling of the tripod-leg shoe when the stand is placed on the floor
- No bending over - the tripod foot plates remain at the tripod during the point of view change
- No cumbersome and time-consuming positioning as when using a tripod star
- The possibility of variable spreading of the tripod remains unchanged

Dual Function

In summer on hot, soft asphalt surfaces
- Even distribution of the instrument weight on the 3 large-surface tripod foot plates
- Minimized sinking in

On smooth surfaces
- 3 slip-resistant hard rubber buffers per tripod-leg shoe
- Uniform distribution of the instrument weight over a total of 9 hard rubber buffers

Description	Order-No.	Euro
Tripod-leg shoe with rubber-buffers (1 piece)	**1973**	44,-

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

Universal Transport Case
s. page 253

Tripod stand adapter for special floors

The measuring possibilities reach their limits on extremely smooth surfaces if even the rubber buffers on the tripod star (No. 1975) or on the tripod stand plate (No. 1973) do not provide sufficient stability or safety against slipping.

A tripod stand adapter acts as an intermediate element between a standard tripod and 3 suction holders or 3 magnetic holders (see below).

- Can be used with all instrument tripods
- Variable rubber cord attachment
- Secure centering of the tripod foot tip
- Cylinder Ø25 x 32 mm made of anodised aluminium with M8 stainless steel thread
- Knurling as screwing and unscrewing support
- Weight: 50 g

Description	Order-No.	Euro
Tripod stand adapter with M8 thread (1 piece)	**1976**	35,-

The tripod foot adapters can be screwed in easily:

In suction holder

For extremely smooth floors such as waxed or polished industrial floors, glass, stone or plastic surfaces
page 117

In magnet holder

For magnetic surfaces such as ships, rail vehicles, industrial plants, tanks etc.
page 115

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**	29,-
	medium (30 mm)	**1468.2**	29,-
	thick (40 mm)	**1468.3**	29,-

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

1468.1

1468.2

1468.2

1468.3

Case with grid foam 10 x 10 mm for individual cutting out

Foam in the bottom part with pre-cut grid foam. 10 x 10 mm grid parts can be quickly and easily cut out for individual use.

- Same features as universal case above
- **Lid**: bubble foam (already glued in)
- **Bottom**: grid foam (to be cut out by yourself as required)

Description	Order-No.	Euro
Transport case Universal with 1 x 1 cm grid foam	**1468.R**	45,-

Paint outlines of the accessories on grid foam, taking into account the slighlty pre-cut 1 cm squares.

If possible, always leave 2 grids (20 mm) free between compartments to ensure sufficient stability.

Cut out grid foam using cutter / parcel knife. Tip: Use a sharp knife. Do not „tear“ but cut.

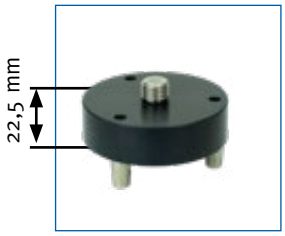
Insert foam in the bottom of the case and glue into case with craft glue or double-sided tape (carpet tape).

Tribrach with Claw System

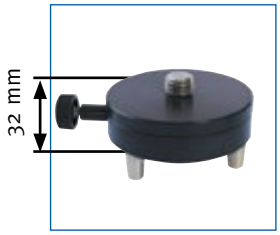
Tribrach

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

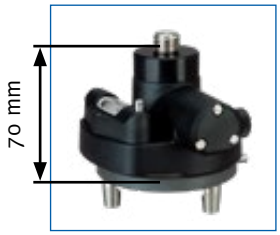
Tribrach-Insers



Description	Order-No.	Euro
Tribrach-insert, 5/8" outer thread, not turnable, H = 22,5 mm	**3452**	48,-

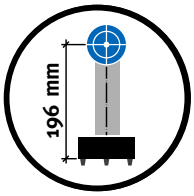


Description	Order-No.	Euro
Tribrach-insert, 5/8" outer thread, turnable, H = 32 mm	**3455**	109,-



Description	Order-No.	Euro
Tribrach-insert with level 5/8", not turnable, H = 70 mm	**3486**	236,-

Description	Order-No.	Euro
Tribrach-insert, Leica stud bolt	**3463.S**	81,-



INFO Adapter to reach the target / tilting axis height of 196 mm
s. next page 255

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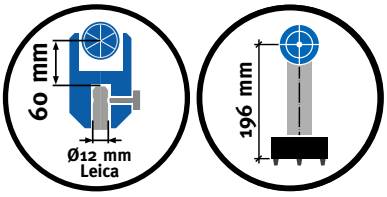


Adapter for Tribrach claw inserts

- 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

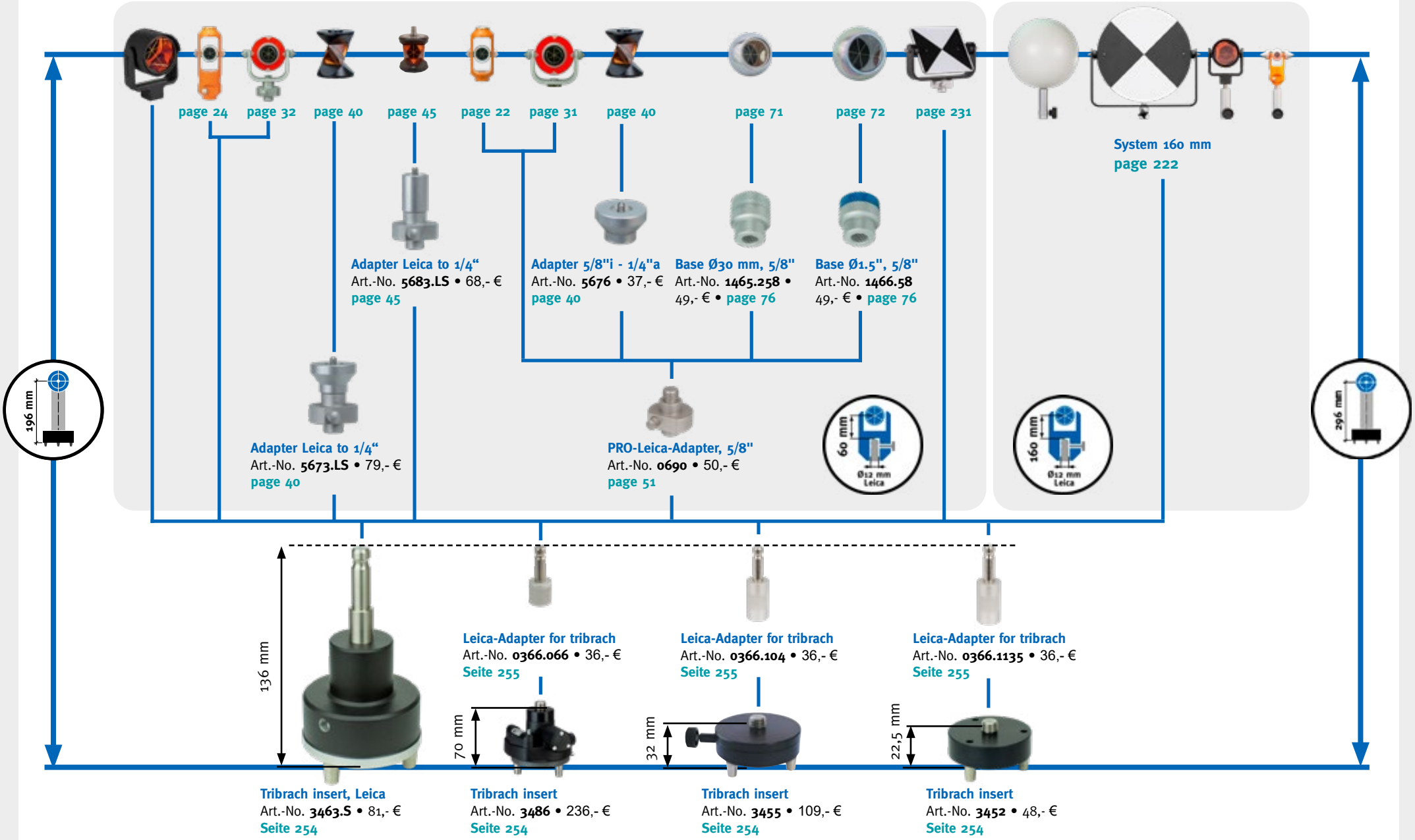
For safe mounting of measuring instruments on tables, workbenches etc.

- 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,-

Tribrach Claw Insert with Leica spigot Ø12 mm (Leica)

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



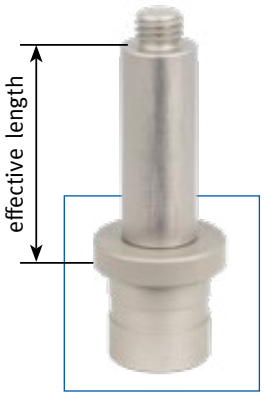
prices do not include any taxes

DIN spigots with 10 mm flange

Outer threads: 5/8" made of aluminium, all others of stainless steel

Description	bottom	top	effective length	Order-No.	Euro
DIN spigot Ø 34 mm with flange 10 mm	5/8" inner thread	M8 outer thread	10 mm	**0360**	30,-
		5/8" outer thread	10 mm	**0340**	23,-
		Leica spigot Ø 12 x 40 mm	50 mm	**0367.40**	38,-

INFO Other top connections are available on request. For example: 1/4“, 3/8“, Leica spigot Ø 12 x 27 mm, etc.



Description	bottom	top	effective length	Order-No.	Euro
DIN spigot Ø 34 mm with flange 10 mm and extension	5/8" inner thread	5/8" outer thread	58 mm	**0305.58**	36,-
			75 mm	**0305.75**	38,-
			108 mm	**0305.108**	42,-
			125 mm	**0305.125**	44,-

INFO Other lengths are available on request.

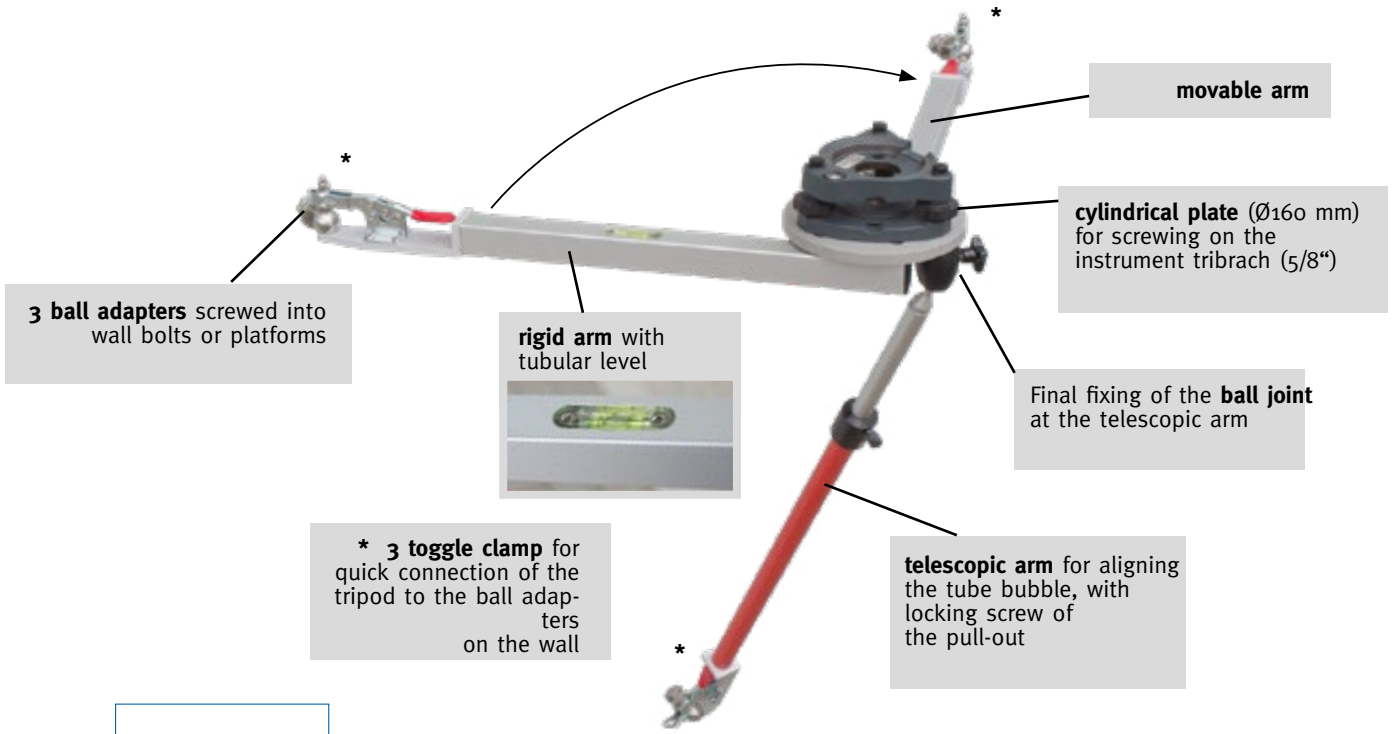
Wall tripod for instruments

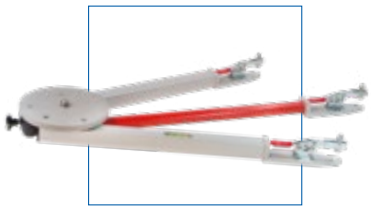
Surveying point on the wall: Fast, accurate, universal, stable, light and compact.
If required, non-destructive mounting without drilling.

Installation of surveying instruments within seconds without ground contact on walls, buildings, tunnel tubes, other structures.
The tripod 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 height-stable instrument tripod is used.

Setup

Two fixed length arms and a telescopic arm are attached to the cylindrical support plate for the instrument. One of the fixed length arms is rigidly screwed on, the other can be moved via a joint. The arms are fixed to the two upper wall points with quick-releases. The telescopic brace is connected to the lower wall point and supports the tripod. With the telescopic pull-out, a tubular bubble can be aligned, which is embedded in the rigid leg. The height of the wall tripod is therefore always fixed at the same point on the top right of the wall.
To fix the tripod to the object, either wall bolts with M8 internal thread or alternatively platforms with steel cylinders, which also have an M8 internal thread, are attached. While holes have to be drilled in the object for the wall bolts, the platforms can be glued non-destructively.
After screwing ball adapters into the M8 thread, the wall stand can be docked in a matter of seconds using toggle clamps.
The 3-point fixing in connection with the M8 ball adapters enables the use of the tripod not only on walls, but also on buildings, equipment, containers, towers, vehicles, etc.



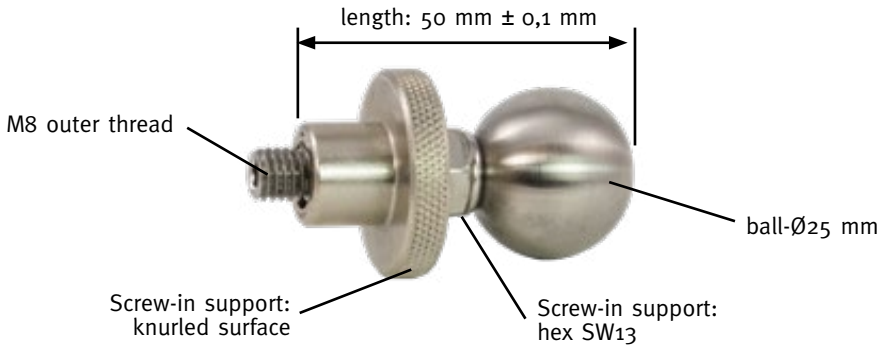


Description	Order-No.	Euro
Wall tripod WATRIPO (Weight: 2,8 kg)	**6850**	935,-

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,-

M8 wall bolts
necessary bore hole Ø12 mm
page 100

M8 stainless steel bolts
necessary bore hole Ø14 mm
page 102

Perforated plate „Fix point“ M8
non-desctructive adhesive
page 101

Suction holder
for smooth, gas-tight surfaces
page 117

Switchable magnet
for magnetic surfaces (iron)
page 115

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Mounting of the tripod without drilling bore holes

Fixing of the 3 platforms „fix point“ to the wall

Tip: Mount the upper two points at approximately the same height.

After hardening of the adhesive: Screw in the 3 ball adapters.

Wall tripod docking with 3 quick releases (toggle clamps)

Aligning the tube bubble which is to be found in the right arm

Fixing the ball joint of the telescopic arm

Measurement and subsequent removal of the platforms with a multifunction device

Transport case

Safe protection of the wall stand during transport.
If necessary, space for a spirit level (max. 80 cm) and some ball adapters.
But not for the tribrach.

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

Description	Order-No.	Euro
Transport case: Wall tripod (fixed height), 81 x 23 x 10 cm	**6890**	89,-

Spirit level

For attaching the fix points to the wall/structure

- LxWxH: 80 x 5 x 2 cm
- aluminium, yellow lacquered
- 3 levels (180°, 90°, 45°), level accuracy 1 mm/m,
- milled bottom side
- weight: 350 g

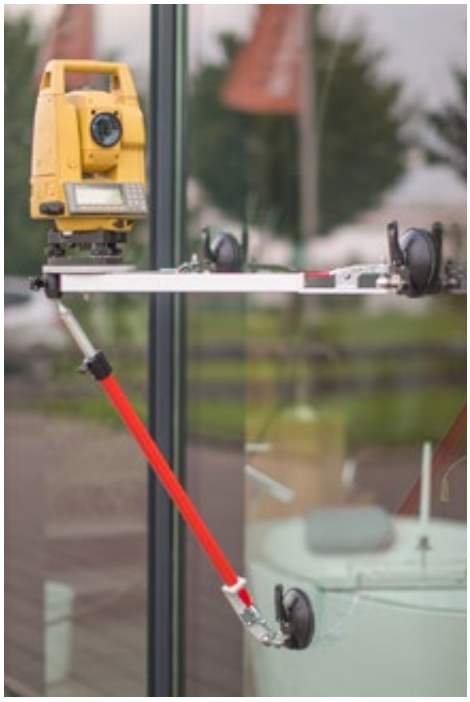
Description	Order-No.	Euro
Spirit level 80 cm	**6854**	21,-

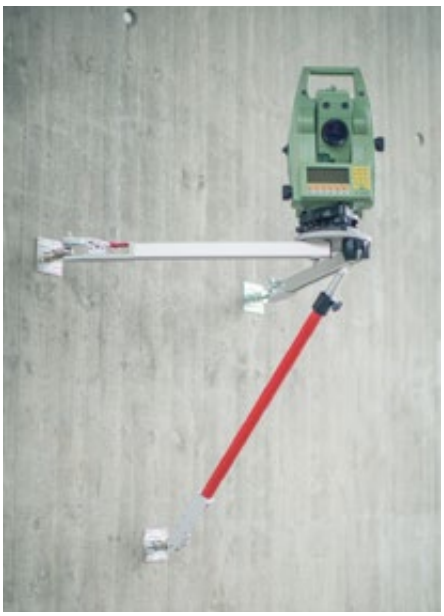
Assembly adhesive

For attaching the perforated plate „fix point“. More information: **s. page 101**

Description	Order-No.	Euro
Assembly adhesive, white, 1 cartridge à 290 ml	**1462**	13,-

Application examples





Mini Instrument Tripod

For the use of laser scanners and total stations in confined spaces.

Surveying instruments cannot be used with the common standard tripods in all areas of application. Often they are too large, too heavy, too bulky. Our Mini Instrument Tripod on the other hand is reduced to the bare essentials.

Stainless steel cap nuts can be screwed into the circular plate with the aid of cylinder head screws (supplied) and used as support tips. In this way, the lowest design can be achieved (see pictures to the right).

Features:

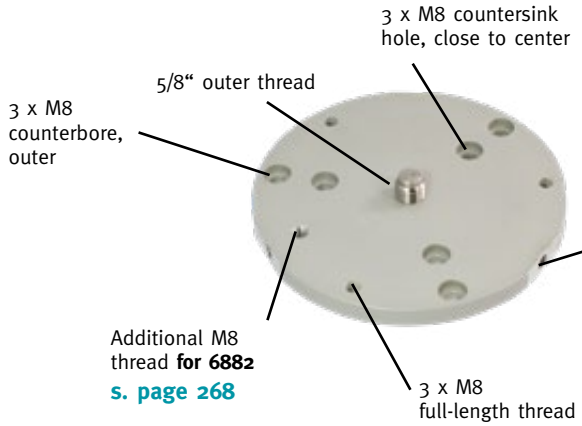
- Stable circular plate with the possibility to screw in various short legs (see next page)
- Positioning close to the ground
- 5/8“ male thread to screw on instrument tribrachs
- Weight: 650 g

Description	Order-No.	Euro
Mini Instrument Tripod (without ball heads)	**6880**	130,-

Scope of delivery and equipment

3 x cylinder head screw for mounting the cap nuts and other accessories
(s. page 265)

3 x stainless steel cap nuts, can be used as contact tips or to secure the cylinder head screws during transport
(s. npage 266)



Carrying case (not suitable for magnets and suction holders)
s. page 253

Ball heads / joints see page 264

Overview of complete accessories s. page 265

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 268) 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,-

5/8“ prisms & adapters

Leica prisms & adapters

Laser Scanner

Total Stations

5/8“ <-> Leica-stud adapter
Art.-No. **0377.27** • 30,- Euro
page 51

If necessary, adapter from 5/8“ to laser scanner

tribrachs
page 254

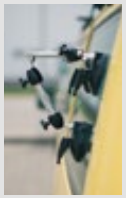
Instrument tripod Mini „Base“ can also be used without additional accessories.

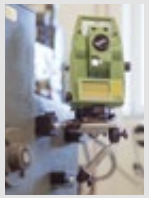
Instrument Tripod Mini „Base“
Art.-No. **6880** • 130,- Euro
page 263

Ball head, M8
Art.-No **5089** • 51,- Euro
page 264
3 pieces are nesessary.

Swivel joint M8
Art.-No. **6885** • 36,- Euro
page 264
3 pieces are nesessary.

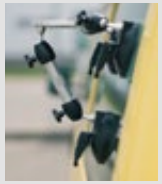
Additional arm for vertical setup of „mini tripod“
Art.-No. **6882** • 68,- Euro
page 268



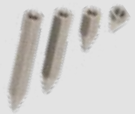


Switchable Magnet M8
Art.-No. **5931** • 47,- Euro
page 266
3 pieces are nesessary.

Suction holder M8
Art.-No. **5938** • 80,- Euro
page 266
3 pieces are nesessary



Rubber ball M8
Art.-No. **5422** • 7,50 Euro
page 266
3 pieces are nesessary.



Stainless steel spikes
page 266
3 pieces are nesessary.

Stable screw clamp M8
Art.-No. **6884** • 79,- Euro
page 267
2 pieces are nesessary.

Switchable Magnet M8
Art.-No. **5931** • 47,- Euro
page 266
3 pieces are nesessary.

Suction holder M8
Art.-No. **5938** • 80,- Euro
page 266
3 pieces are nesessary.

Further setup options

Depending on the type and condition of the ground, the ball heads (or the circular plate directly) can be equipped with further types of feet.

Please note that you need the respective foot **three times:**

Spikes for various undergrounds

Description	Length	Order-No.	Euro
Spike, stainless steel, M8 internal thread	**20 mm**	**2059.20**	19,-
	34 mm	**2059.34**	19,-
	70 mm	**2059.70**	23,-
	84 mm	**2059.84**	23,-

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 115)	**5931**	47,-

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 117	**5938**	80,-

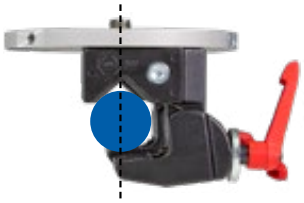
Stable universal screw clamp M8

For attaching the „Instrument Tripod Mini“, prisms and targets to poles and surfaces, such as scaffold struts, table tops, steel beams, floorboards, etc.

- Very stable quality clamp made of full metal
- Rubberized clamping surfaces to protect the material
- Clamping range on cylinders and surfaces, Ø/thickness: 13 - 55 mm
- Two M8 inner threads
- Clamping lever with latching function, i.e. lever direction can still be aligned even after after tightening
- Insertable insert for flat surfaces (plates, table edges, boards, etc.)
- Incl. two cylinder screws M8x20 mm for attachment to tripod plate 6880 (see below)

Description	Order-No.	Euro
Uni. Screw clamp M8, with screws and flat piece	**6884**	79,-

Clamping range (diameter or flat material): **13-55 mm**.



Pressure range of the clamp is exactly in the center axis of the instrument tripod.

With optional usable flat pressure piece.

Use with instrument tripod Mini

For this purpose, 2 screw clamps are screwed to the tripod plate 6880 (s. page 263):

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 105

With scanning targets s. page 242

Extension: Support arm

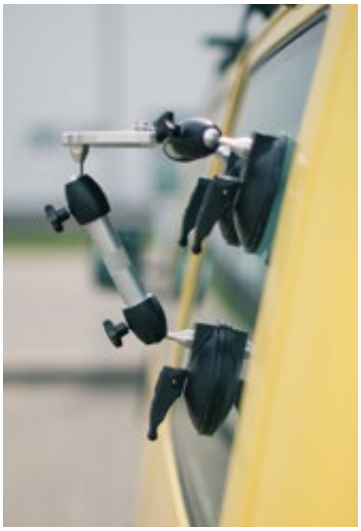
For using the mini tripod on vertical walls and surfaces

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 269).



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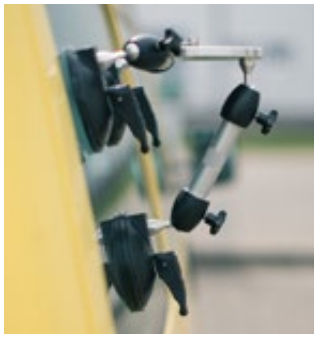
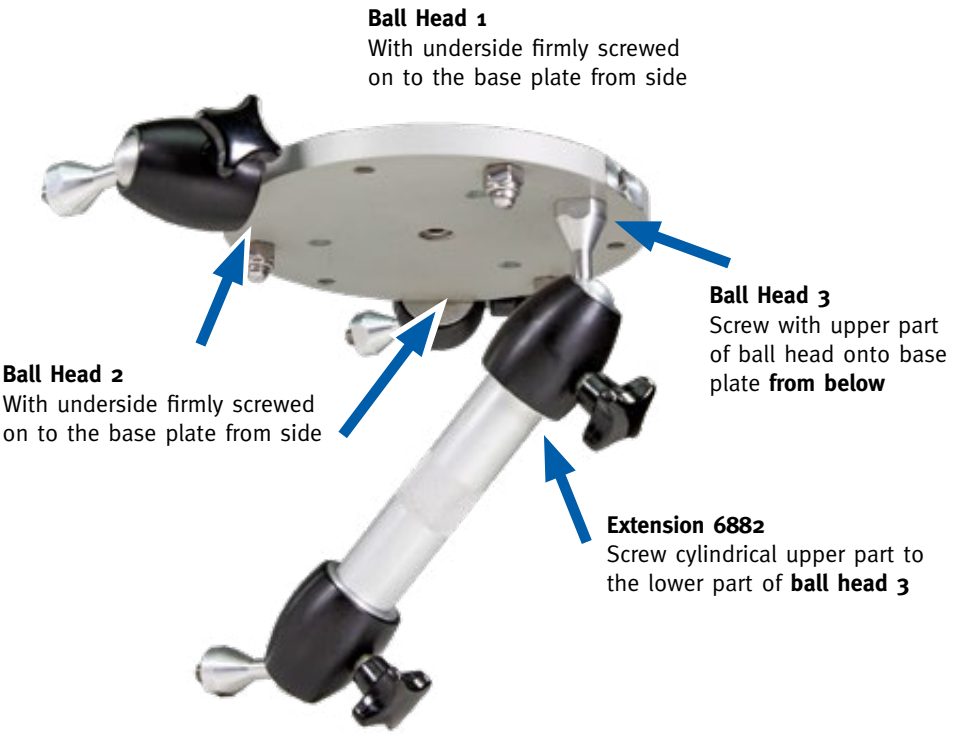


Manual: Instrument Tripod Mini - Vertical

- 688o 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.

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

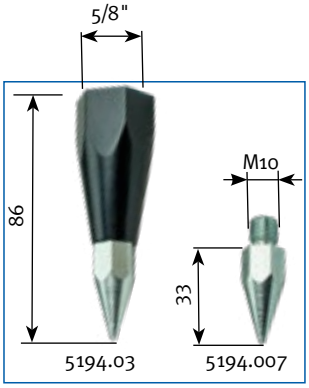
The inner rod is not clamped with a screw clamp (as with other prism rods), but with an eccentric lever (Figs. 1 and 2).

- 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**	275,-

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.

INFO On request, the pole is also available with screw clamping.



Wear and spare parts

Description	Order-No.	Euro
Tip for prism pole, complete	**5194.03**	16,-
Tip for prism pole, only steel base part	**5194.007**	5,-

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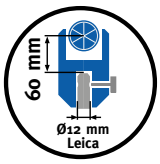
Prism Pole Accessories

Adapter for Prism Pole

Our prism pole S_10 comes with a 5/8“ female thread in the inner tube.
The adapters required for the respective prism system are screwed into this thread.
The scaling on the inner pole is matched to the adapters.

- 5/8" outside thread to screw onto prism pole
- **150 mm** from upper edge of prism pole to prism/target centre



For prisms with:

5/8" inside thread and 50 mm tilting axis heights

z.B. our prism series HIP

Description	Order-No.	Euro
Extension 2 x 5/8" outside thread, effective length 100 mm	**0297.100**	30,-

5/8" inside thread and 100 mm tilting axis heights

Works with prism KTR1 (for example)

Description	Order-No.	Euro
Extension 2 x 5/8" outside thread, effective length 50 mm	**0297.050**	28,-

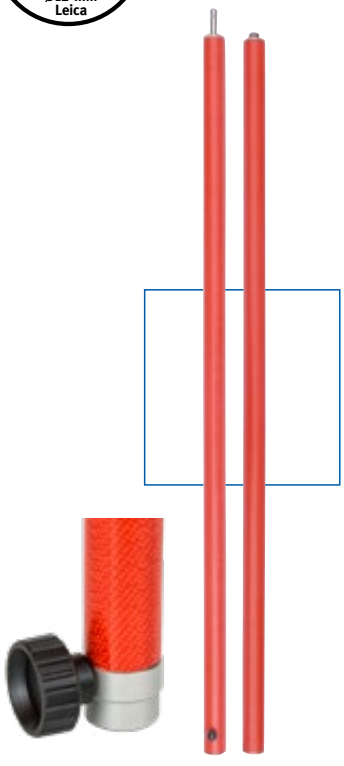
Leica socket Ø 12 mm

For Leica prisms with distance of 60 mm from top edge of bolt to centre of the prism.

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

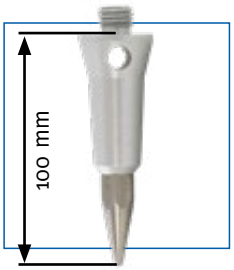
Extensions 0,5 m and 1 m

Made of GFK/CFK. Very light and durable. The extensions are designed so they can be used **between adapter and prism / target**.



5/8“ Extensions						
Ø	bottom	top	length	weight	**Order-No.**	Euro
32 mm	5/8“ inside thread	5/8“ outside thread	0,5 m	350 g	**5455.2**	84,-
			1,0 m		**5455**	105,-

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



Tip for prism/GNSS pole

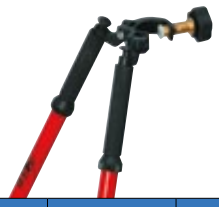
- Ø32 x 100 mm
- 5/8“ male thread
- Aluminium with exchangeable V2A-tip
- Weight: 100 g

Description	Order-No.	Euro
Prism pole tip, 5/8“, Ø32 x 100 mm	**5502**	37,-

Strut Tripods / Bipods

For quick and easy installation of prism poles in any terrain.

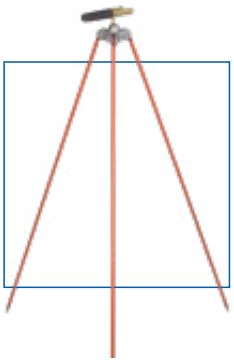
Bipod (Seco)



- Top pushbutton clamp
- Adjustable range of legs: 1,05 – 1,80 m
- Open clamp for lateral insertion of the poles
- Suitable for poles with Ø : 25 – 38 mm

Description	Order-No.	Euro
Strut bipods, 2 legs, Alu, red, 1,8 kg	**2091.R**	158,-

ON REQUEST	Other bipods and tripods available on request.



Ranging Pole Tripod

Standard design, 3 legs, with holding clamp on ball joint, height approx. 95 cm, PVC-coated 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 tripods).
We offer sleeves for the common pole standard Ø 32 mm.

- Sleeve inner Ø 32 mm, outer Ø 35 mm
- Length 60 mm
- Anodised aluminium
- Can be used on already damaged pole
- Weight: 24 g

Description	Order-No.	Euro
Protective sleeve for Ø32 mm poles, length 60 mm	**5610.B**	20,-

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Compass with Velcro fastener

Compass for GNSS and prism poles for approx. indication of the cardinal direction.

- Very fast alignment to „North“
- Reduced tendency of bubbles occurring
- Velcro fastener with redirection for reliable and quick attachment to the pole
- Weight: 20 g, Compass-Ø: 20 mm

Description	Order-No.	Euro
Compass with Velcro fastener, for poles **Ø 18 - 32 mm**	**5475**	18,-
Compass with Velcro fastener, for poles **Ø 40 mm**	**5476**	21,-

Description	Order-No.	Euro
Compass (single) as spare part, with adhesive foil	**5475.E**	1,50

Replacing a defective compass (single):



Compass in Aluminium-Holder

- Robust aluminium construction
- For mounting on all prism/GNSS antenna poles with **Ø 32 mm** (1 1/4")
- Simple screwing/height adjustment of the compass holder with Allen key (5 mm)

Description	Order-No.	Euro
Holder with compass for poles with Ø 32 mm	**3008.K**	38,-

For other poles with **Ø 20 to 32 mm we offer a reduction sleeve** made of plastic. It ensures a firm fit of the compass holder and protects the pole surface.

Description	Order-No.	Euro
Pole-Ø reduction sleeve (Ø32 mm): For poles 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)
- Weight: 25 g

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

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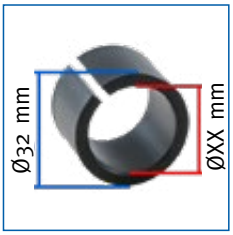
Adjustable circular level in Aluminium-Holder

- Sturdy aluminium construction
- For mounting on all prism/GNSS antenna poles with Ø 32 mm (1 1/4")
- Easy screwing/height adjustment of the holder with Allen key (5 mm)
- Level adjustment with 2,5 mm-hex wrench
- Glass level in aluminium frame
- Level accuracy: 10' or 30'

Description	Order-No.	Euro
Holder with circular level 10', for poles with Ø 32 mm	**3008.10**	51,-
Holder with circular level 30‘, for poles with Ø 32 mm	**3008.30**	48,-

For other poles with **Ø 20 to 32 mm we offer a reduction sleeve** made of plastic. It ensures a firm fit of the compass holder and protects the pole surface.



Description	Order-No.	Euro
Pole-Ø reduction sleeve (Ø32 mm): For poles with Ø20 mm	**3008.3220**	11,-
Pole-Ø reduction sleeve (Ø32 mm): For poles with Ø23 mm	**3008.3223**	11,-
Pole-Ø reduction sleeve (Ø32 mm): For poles with Ø25 mm	**3008.3225**	11,-
Pole-Ø reduction sleeve (Ø32 mm): For poles with Ø26 mm	**3008.3226**	11,-
Pole-Ø reduction sleeve (Ø32 mm): For poles with Ø27 mm	**3008.3227**	11,-

INFO Other diameters available on request.

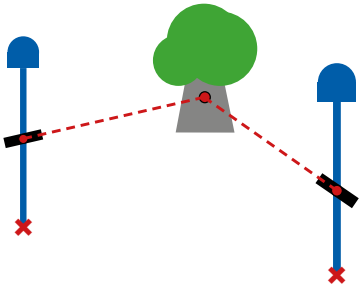
Second Level

If only one circular level is used on the pole, its adjustment should be checked daily. To increase the reliability of the measurement, we therefore recommend the use of a second level for high accuracy applications. It is screwed to the pole independently of the 1st level. After careful adjustment of both vials, the correct vertical position of the pole is ensured, if both levels are being used simultaneously. The two levels virtually 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 278
- Weight: 240 g

Description	Order-No.	Euro
Holder **KiLas-Geo** (without laser distance meter)	**2800**	142,-

The following laser distance meters can be used with the KiLas-Geo:
Leica DISTO D410, D5, D510, D8, D810 touch, S910 and more.

INFO With the KiLas-Geo other laser distance meters can also be used. Please contact us.

Pole Adapter

To use the KiLas-Geo holder with cylindrical poles of all kinds
The 12 mm bolt of the KiLas-Geo tilting mount is inserted into the plastic bearing on the pole adapter. A star grip screw secures the adapter and adjusts the tipping resistance.
With all pole adapters, the tilting axis runs through the pole axis at right angles due to the design. This ensures correct measurement results.

- Weight approx. 150 g

Description	Order-No.	Euro
Pole clamp for poles **Ø 18-32 mm**, with bolt socket Ø 12 mm	**2810**	68,-
Pole clamp for poles **Ø 30-45 mm**, with bolt socket Ø 12 mm	**2811**	68,-
Pole clamp for poles **Ø 32 mm**, with bolt socket Ø 12 mm	**2812**	68,-

Laser odometer without inclination sensor

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

Description	Order-No.	Euro
Tube level for KiLas Geo with 2 fixing screws	**2808**	8,50

Telescopic Carbon Pole for KiLas-Geo

Basically, the KiLas-Geo can be used with any existing pole.

In combination with the pole adapter 2820 we recommend the LEKI pole 2912. **Compact, stable and very light**.

A self-explanatory clamping system allows the pole to be extended and securely fixed in seconds (Fig. 1). Use the circular level of the pole adapter No. 2820 to adjust the holder perpendicularly (Fig. 3).

- Robust carbon telescopic pole
- Length pushed together 68 cm (Fig. 2)
- 4 segments with scaled length adjustment from 120 cm to 170 cm
- Hardened pole tip with attachable rubber protection (Fig. 6)
- 1/4"-Photo thread under removable protective cap (Fig. 5)
- By screwing the holder directly onto the 1/4“ thread, distances can be measured at inaccessible points with the telescopic pole (timer function see Fig. 7 and 8).
- Weight: 330 g

Description	Order-No.	Euro
Telescopic pole, 4 segments, with 1/4" outer thread	**2912**	89,-

Pole adapter with circular level

- For use on poles that are not equipped with a circular level
- A Velcro fastener with deflection ensures that the adapter fits firmly on the pole
- For all poles with Ø 18-35 mm
- Weight: 200 g

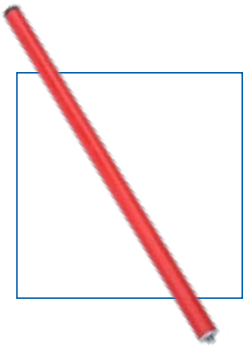
Description	Order-No.	Euro
Pole adapter with circular bubble and Velcro fastener, with bolt socket Ø 12 mm	**2820**	47,-

Pole to extend building lines

A 40 cm long pole is screwed into the KiLas-Geo (possible on both sides). By placing the pole against the building wall, the building alignment is constructively extended so that it runs through the defined reference point of the distance measurement; even when the support is tilted.
The laser distance meter is aligned on a target plate that extends the opposite building alignment. It can be stopped at a distance of up to 30 cm from the corner of the building and can also be tilted (see picture).

INFO

By using the extension pole in conjunction with the building target panel, building lengths can be measured exactly at a parallel distance of up to 30 cm. Thus the KiLas-Geo can also be used on building sides, which could not be measured since then due to obstacles, e.g. down pipes of gutters etc.

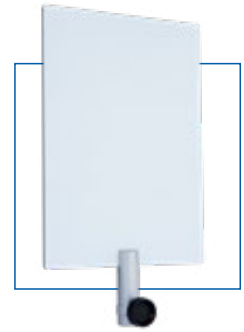


- Pole-Ø 20 mm, made of GFK/CFK, red
- M8 outer thread made of stainless steel
- Weight: 90 g

Description	Order-No.	Euro
Extension pole for KiLas-Geo, Ø 20 x 400 mm (GFK/CFK, red)	**2806**	44,-

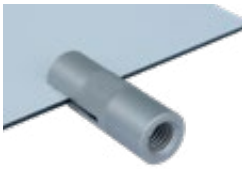
Target-Plate for poles

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



- Composite panel with white surface: DIN A4-sized (21 x 30 cm)
- Front of the panel is in the axis of the connecting thread / the pole axis
- Weight: 360 g

Description	Order-No.	Euro
Target-Plate ZA4, white, 21 x 30 cm, **5/8" internal thread**	**6062**	50,-
Target-Plate LA4, white, 21 x 30 cm, **Leica socket** Ø12 mm	**6064**	56,-



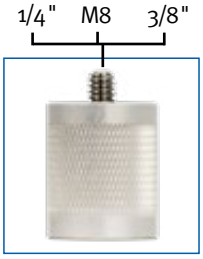
Thread connection Adapters

Made of stainless steel with cross knurl

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

Made of aluminium with stainless steel external thread

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



Made of aluminium with stainless steel external thread

Description	bottom	top	Effective length	Order-No.	Euro
Extensions Ø 25 mm, 5/8" thread	5/8" inner	M8 outer	30 mm	**0383**	26,-
		1/4" outer	30 mm	**0390**	23,-
		3/8" outer	30 mm	**0382**	26,-

5/8“ Extensions

Made of aluminium

Description	bottom	top	Effective length	Order-No.	Euro
Extension Ø 25 mm, 5/8" thread	5/8" inner	5/8" outer	30 mm	**0300.030**	28,-
			50 mm	**0300.050**	28,-
			64 mm	**0300.064**	28,-
			65 mm	**0300.065**	28,-
			75 mm	**0300.075**	28,-
			86 mm	**0300.086**	30,-
			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 282).

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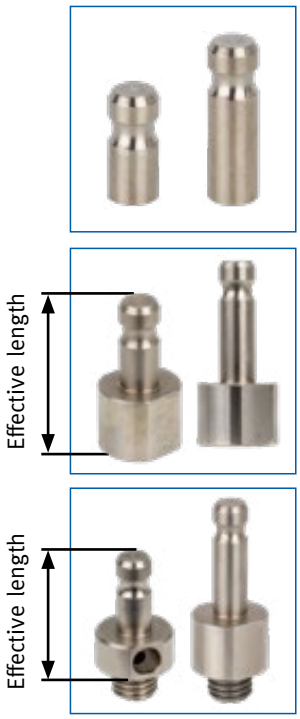
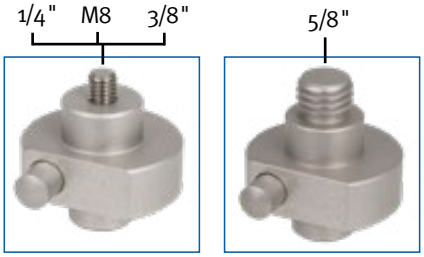


Adapter: Thread connection to Leica spigot

- Stainless steel design

Description	bottom	top	Effective length	Order-No.	Euro
Adapter M8 - Leica	M8 inner	Leica spigot Ø 12 x 27 mm	27 mm	**0180.25**	13,-
		Leica spigot Ø 12 x 40 mm	40 mm	**0180.30**	15,-

Description	bottom	top	Effective length	Order-No.	Euro
Adapter 5/8" - Leica	5/8" inner	Leica spigot Ø 12 x 27 mm	47 mm	**0377.27**	30,-
		Leica spigot Ø 12 x 40 mm	60 mm	**0377.40**	33,-
	5/8" outer	Leica spigot Ø 12 x 27 mm	40 mm	**0378.27**	30,-
		Leica spigot Ø 12 x 40 mm	60 mm	**0378.40**	33,-



Adapter: Leica mount to thread connection

- With push button for one-hand operation
- Made of anodised aluminium

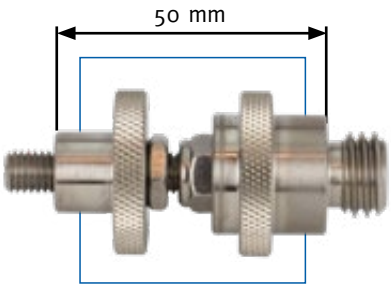
Description	bottom	top	Effective length	Order-No.	Euro
Adapter, Leica - Threads	Leica socket Ø 12 x 26 mm	M8 outer	10 mm	**0680**	50,-
		1/4" outer	10 mm	**0692**	50,-
		3/8" outer	10 mm	**0693**	50,-
		5/8" outer	10 mm	**0690**	50,-

- With horizontal locking screw
- No. **0291.10** can be used for all Leica spigot sØ 12 mm, for No. **0306.10** the spigot has to be 40 mm long
- Made of anodised aluminium

Description	bottom	top	Effective length	Order-No.	Euro
Adapter Leica - Thread	Leica socket Ø 12 x 26 mm	M8 outer	10 mm	**0302.10**	29,-
	Leica socket Ø 12 x 26 mm	5/8" outer	10 mm	**0291.10**	29,-
	Leica socket Ø 12 x 40 mm		10 mm	**0306.10**	30,-

Adapter: M8 – 5/8" - rotateable

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

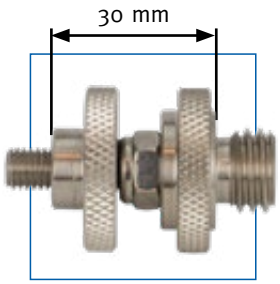


Length 50 mm

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

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

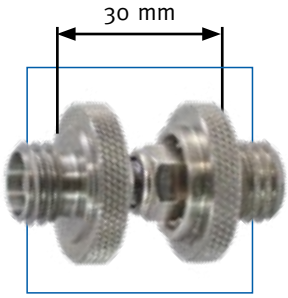
Example: Wall offset system 100 mm with HIP prisms see page 52



Length 30 mm

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

Adapter: 5/8“ - 5/8“ - rotateable

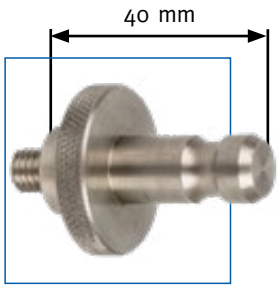


- Side 1: 5/8“ thread for connecting poles, extensions, etc.
- Side 2: 5/8“ thread for connecting the reflector supports
- One axis -› independently rotatable around this axis
- Rotational resistance can be adjusted with self. hexagon nut (SW 13)
- Large knurl for safe screwing in without tools
- Stainless steel design

Description	Order-No.	Euro
Adapter 2 x 5/8“ external thread, rotatable	**0824**	47,-

Example: Using HIP-Prisms for stacking see page 64

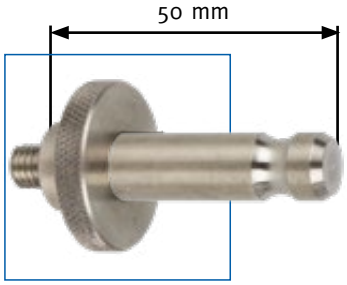
Adapter: M8 – Leica Ø 12 mm



- 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 52



Same features as adapter 0830 (see above). But:
- Bolt Ø 12 x **40 mm**, total length (without M8 thread): **50 mm**

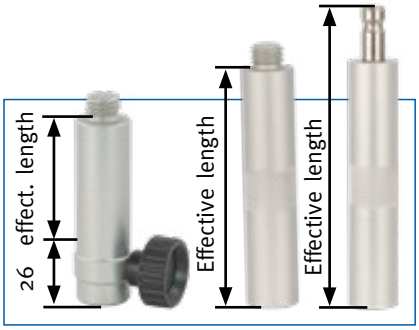
Description	Order-No.	Euro
Adapter WA Leica **40**, M8 – Leica Ø 12 x **40** mm	**0831**	20,-

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

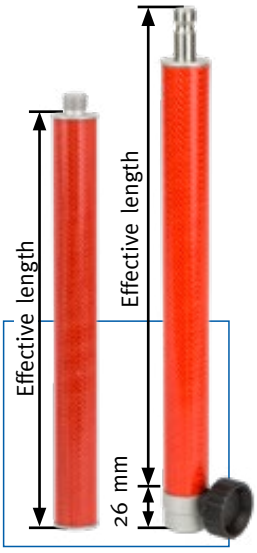


Description	bottom	top	Order-No.	Euro
Extension Ø 25 mm	5/8" inner-thread	5/8" inner thread	**0295.L**	30,-
		5/8" outer thread	**0300.L**	34,-
		Leica spigot Ø 12 x 27 mm	**0377.L**	39,-
	5/8" outer-thread	5/8" outer thread	**0297.L**	36,-
		Leica spigot Ø 12 x 27 mm	**0376.L**	41,-
	Leica socket Ø 12 x 26 mm	5/8" inner thread	**0290.L**	36,-
		5/8" outer thread	**0291.L**	38,-
		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	5/8" inner thread	**5630.L**	86,-
		5/8" outer thread	**5631.L**	89,-
		Leica spigot Ø 12 x 27 mm	**5632.L**	95,-
	5/8“ outer-thread	5/8" outer thread	**5633.L**	89,-
		Leica spigot Ø 12 x 27 mm	**5634.L**	98,-
	Leica socket Ø 12 x 26 mm	5/8" inner thread	**5635.L**	112,-
		5/8" outer thread	**5636.L**	116,-
		Leica spigot Ø 12 x 27 mm	**5637.L**	121,-

INFO Fixed lengths 0.5 m and 1.0 m with Ø32 mm see page 271

info@bohnenstingl.de · www.bohnenstingl.de

prices do not include any taxes

Order Form – Tel. +49 (0) 7143 / 89 10 03

Bohnenstingl GmbH
Ernst-Ackermann-Str. 20/1
D-74366 Kirchheim/Neckar

Customer (Invoice Address)

Delivery Address:

Customer-No.:

Company:

Address:

Contact Person:

Tel./Fax:

E-Mail:

Order

Order-No.	Description	Quantity	Unit Price	Total Price
		Total:		

Delivery

Instant ☐	Date
Notes:	

Orders are placed on the basis of the general terms and conditions of the Bohnenstingl GmbH (01.11.2020)

Location Date Signature

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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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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.

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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

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The delivery usually takes place within one week. We confirm longer delivery periods. Partial deliveries are made by arrangement.

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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.

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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.

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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.

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Returns of goods delivered by us require our explicit consent and are made by a collection arranged by us. We shall bear the costs for returns if the return delivery is due to defective goods. In all other cases, the costs of the return delivery shall be paid by the customer. Custom-made products will not be taken back.

Drawings and descriptions of the products
The dimensions and descriptions stated in our catalogues and brochures or other documents are only approximately binding. We expressly reserve the right to make changes and technical improvements. Illustrations are completed for a better understanding of the scope of delivery.

Freight charges
Shipments are delivered with a parcel service commissioned by us. Other delivery after arrangement. The freight costs incurred by us are presented by us and charged with the goods. The transport risk is transferred to the customer when leaving our factory.

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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.

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Obvious transport damage must be reported to the parcel service immediately. Subsequent complaints about transport damage will generally not be accepted by the parcel services.

Place of Jurisdiction / Place of Performance
Place of performance is Kirchheim, place of jurisdiction is Besigheim or Heilbronn, only German procedural law applies.

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prices do not include any taxes