



# Bohnenstingl

## Special Surveying Equipment

Complete Catalogue - English

# 2019



Special Surveying Equipment  
EST 1984

# Catalogue Content

## Page 1 of 1

### 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.  
Also you can use the [icons](#) on the bottom of each page, which help you with the navigation through the catalogue.

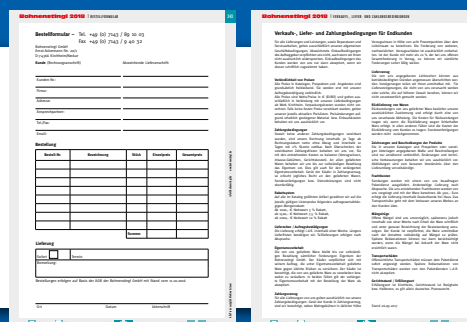
### Products

page 5



### Sales, - delivery, - and terms of payment / order form

page 202





# Values

■ Page 1 of 2

## Quality

Our products are manufactured exclusively from high quality materials and are assembled in our own house.

## Customer Service

As the company name already indicates, we also dedicate ourselves to special measuring tasks and try to find solutions together with our customers.

## Stability, longevity, precision

In order to be able to guarantee high accuracies permanently, we manufacture CNC-controlled prism holders from metal. We use modern high-performance composite materials for sewer poles and track gauges.



Tablet of contents



Print page

previous page



next page

step back



step forward

# Values

■ Page 2 of 2

## Experience

Bohnenstingl GmbH has been developing products for the surveying industry since 1984. The surveying office of the same name incorporates practical experience.

## Extensibility

We are always anxious to develop products in consideration of surveying standards. This ensures compatibility with existing accessories and the maintenance of the value of our products.

## Development

Should you encounter a problem during your work, or already have suggestions for solutions, you will find a competent contact person with us.

Tablet of  
contentsPrint  
pageprevious  
pagenext  
pagestep  
backstep  
forward

# Products

## ■ Page 1 of 3

### A Prisms & Accessories

page 8

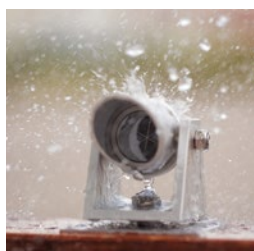
- Prism constant
- Prism series HIP
- Prism holder for MP 24
- Cylinder prism ZP11
- 360° prisms
- Accessories for prisms



### B Monitoring & Tunneling

page 48

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



### C Precision measurements

page 87

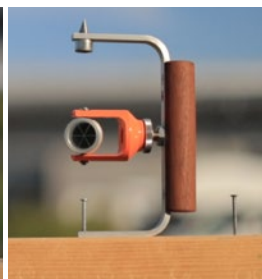
- Industrial 3D measurement: Stainless steel bases
- Klimax: Measurement of ground and wall points
- Modular Mini-Vektor
- Mini-Vektor
- Ground tripod "triangle"



### D Batter boards

page 108

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





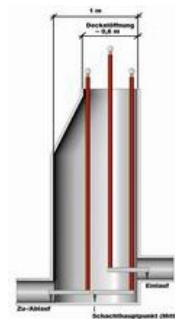
# Products

## Page 2 of 3

### E Sewer Surveying System

page 115

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



### F Building / structure surveying

page 127

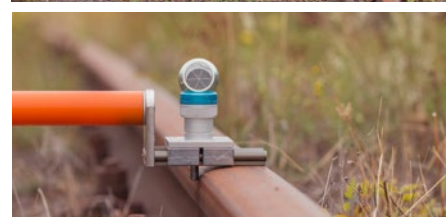
- Offsets for building corners
- Goose neck prism holder
- Precision prism 17.5
- Chamfer angle



### G Track and Rail Surveying

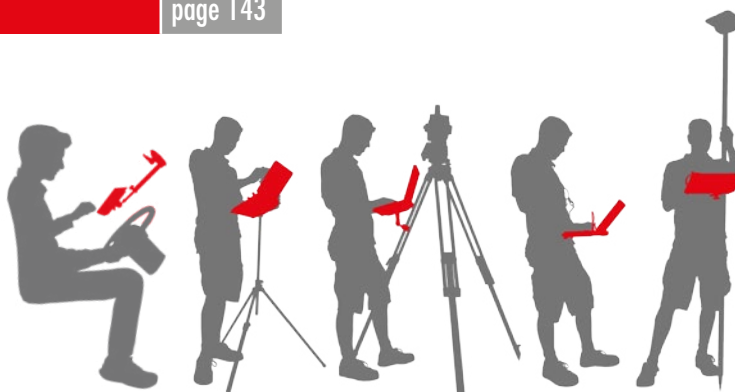
page 132

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



### H Computer Holders

page 143



# Products

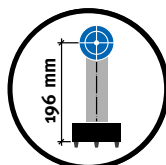
## ■ Page 3 of 3

I

### Laserscanning

page 175

- Laserscanning sphere target
- Circular targets with centered magnetic connection
- Holder for tribrach inserts



J

### General Surveying Accessories

page 182

- Instrument tripod
- Mounting tribrachs to desk plates
- Tribrachs and inserts
- Tripod rubber feet
- Universal Transport case



K

### Adapters & Extensions

page 199



Tablet of contents



Print page

previous



next

step back



step forward

## Prism Constant

In the current tachymeter generation, 2 definitions of the prism constants (offset) have to be distinguished.

The manufacturers **Nikon, Pentax, Sokkia, Spectra Precision, Topcon, Trimble** (in the past Geodimeter, Zeiss) and more now define the prism constant without exception as an „improvement“, i.e. as correct-sign correction of the measured distance based on the physical and design properties of the measured prism or reflector. With the triple prism, these are the type and length of the glass body and the mechanical mounting of the prism on the carrier / holder. The size of the prism constants results from the distance between the vertical axis of the prism holder (target point) and the (theoretical) reversal point  $S_0$  of the measuring beam. If the standing axis is realized exactly in this point  $S_0$  (e.g. this was the case for early Geodimeter prisms - see upper drawing) the prism constant is  $= 0$ . With commercially available prisms (except some prism rings), the vertical axis is always in front of the reversal point  $S_0$ . A distance is therefore measured too long and the improvement ( $=$  prism constant  $K$ ) is therefore negativ. If the vertical axis runs through the visible center of the prism as shown in the drawing below, also known as central symmetric point ZP, this is the most error-theoretically favourable mounting of the reflector. A prism that is inaccurately aligned with the tachymeter then has the least effect on the angle and distance measurement.

The range of constants of glass prisms varies from  $-11.3$  mm to  $-35$  mm, depending on the length of the glass.

Only the company **Leica** has another definition of the prism constant. It refers the specification of the prism constant to its standard round prism (GPH1 + GPR1). According to the above calculation, this has a true prism constant (improvement) of  $-34.4$  mm. Leica defines this prism in its system with a constant of  $0.0$  mm.

Therefore, the constants of Leica prisms and non- Leica prisms must be converted into the other system as follows when used in conjunction with each other:

If a non-Leica prism, where the true prism constant is given, is to be used with a Leica total station,  $34.4$  mm must be added. Example of a non-Leica prism with a true constant of  $K = -30$  mm:

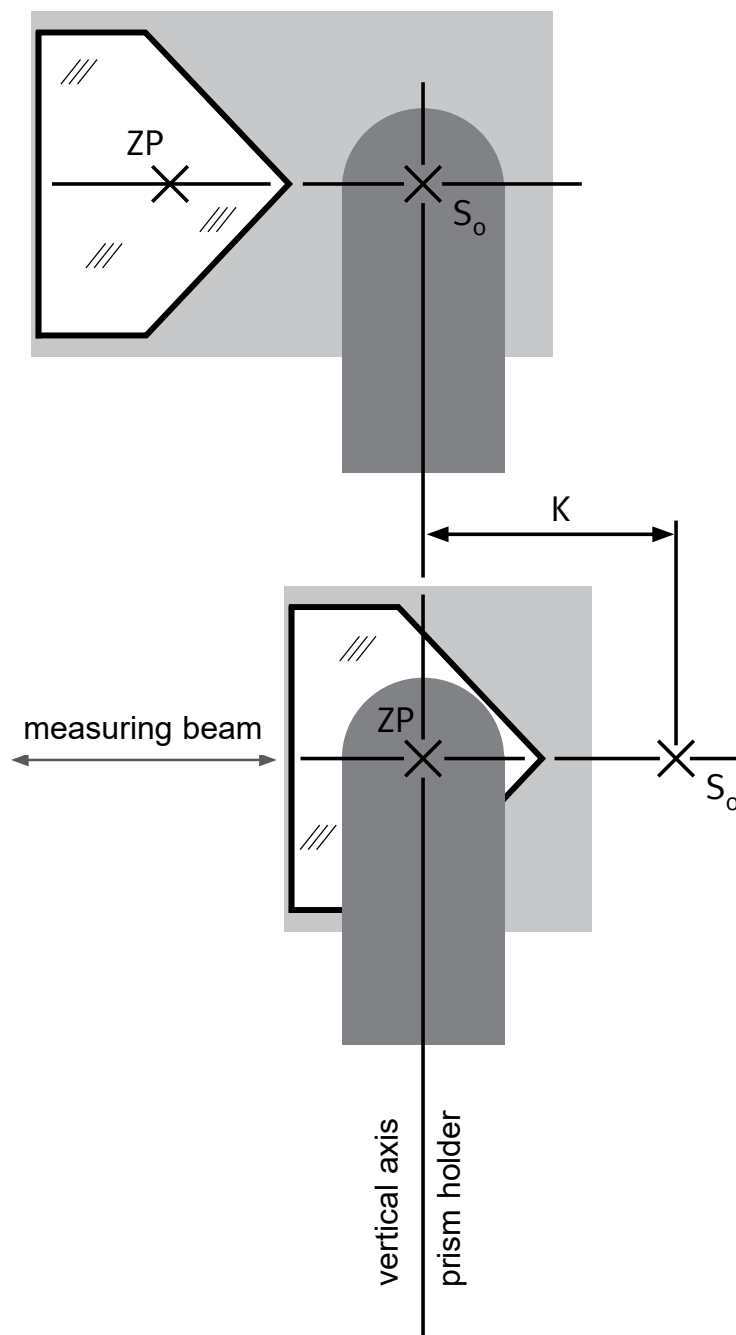
$-30.0 \text{ mm} + 34.4 \text{ mm} = \mathbf{+4.4 \text{ mm}}$ . This must be set on the Leica total station.

However, if a Leica prism, where the prism constant is specified in the Leica system, is to be used with a non-Leica total station,  $34.4$  mm has to be subtracted.

Example for the Leica 360°-Prism GRZ122 with the Leica constant of  $+23.1$  mm:

$+23.1 \text{ mm} - 34.4 \text{ mm} = \mathbf{-11.3 \text{ mm}}$ . This must be set on the non-Leica total station (rounded if necessary).

The following table (next page) takes the above facts into account and shows the constants of the most commonly used prisms and reflectors for the non-Leica systems and the Leica system. With modern total sta-



ons, 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. Tachymeters with self-detection of the prism type are not yet on the market. 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 TOP/ONRT	„Rundum“-Prism 6x60°	360°-Prism Medium Format	Precision Prism 17.5	PP 17.5 for concrete bevels	Ball prism Ø 30 mm and 1.5"	Prism on L-holder with magn. base	Ball prism, indust. 3D-Measurements	Ball prism, Ground points	Monitoring Prism Series MoniPro	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	●	●	○						●				
<p>● = 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. <b>With these prisms precision measurements can be performed.</b></p> <p>○ = No mounting of the prism/reflector in the centrally symmetrical point (visible center)</p>															



# Prisms & Accessories

## Page 1 of 2

### A.1 Mini Prism Series HIP

page 12

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



### A.2 Holder series ONRT for MP 24

page 19

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



### A.3 Cylinder Prism ZP11

page 26



### A.4 360°-Prism & Accessories

page 29

- „RUNDUM“-Prism 6x60° & Accessories
- 360°-Prism Bo Medium Format
- Accessories for Leica GRZ101/ 4/121/122



# Prisms & Accessories

■ Page 2 of 2

A.5 Accessories for Prisms

page 38

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



Table of contents



Print page

previous page



next page

step back



step forward



# Prisms & Accessories

## ■ Mini Prism - Series HIP

Page 1 of 1

### A.1.1 General Information - Series HIP

page 13

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



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

page 14



### A.1.3 Prism holders with Leica sockets

page 16



### A.1.4 Offset spikes for Series HIP

page 18



## Mini Prism & Holder: Series HIP

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

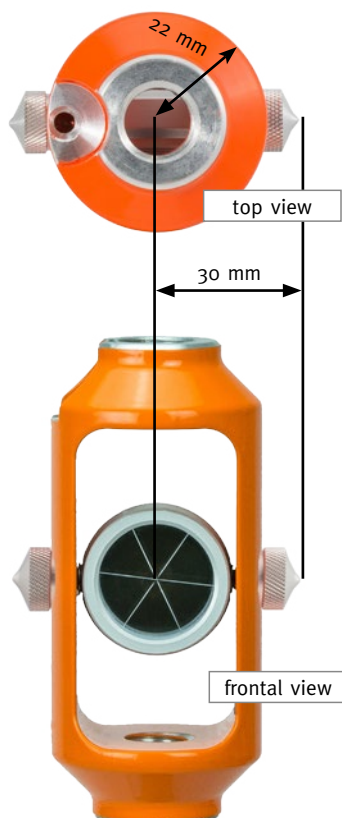
- Adjustable tilting resistance of the prism
- Low space requirement of the prism carrier (radius only 30 mm)
- Glass Ø = 25 mm, except with prism constant  $K = -11,3$  mm: glass Ø = 17,5 mm
- Distance measurement range up to more than 1000 m depending on device and weather conditions
- Mirrored reflective 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)	<b>1615.2</b>	25,-

### ■ Red marked prism center

For a better targeting with the tachymeter we deliver the series HIP optionally with a red marked prism center. **Additional charge: 5,- € / prism**  
Please contact us for this option.



### ■ Circular Level

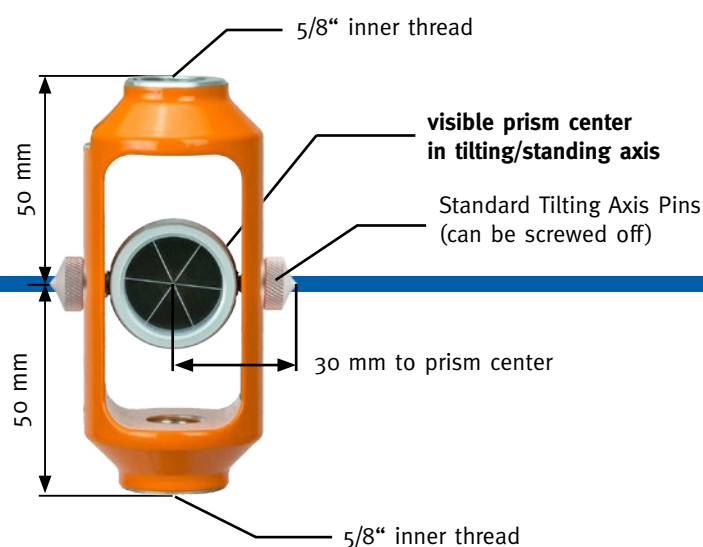
Various circular levels are available on [page 39](#).



## Prisms with 5/8" thread connection

### Prism HIP 2 x 5/8"

#### ■ Prism Holder with closed design

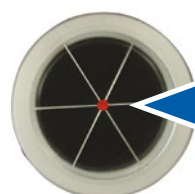


Description	Ø glass prism	prism constant K	Order-No.	Euro
Prism HIP 2 x 5/8"	17,5 mm	<b>-11,3</b> (Leica = +23,1) mm	<b>1610.11</b>	210,-
	25 mm	<b>-16,9</b> (Leica = +17,5) mm	<b>1610.17</b>	210,-
	25 mm	<b>-30</b> (Leica = +4,4) mm	<b>1610.30</b>	235,-
	25 mm	<b>-34,4</b> (Leica = +0) mm	<b>1610.34</b>	240,-
	25 mm	<b>-35,0</b> (Leica = -0,6) mm	<b>1610.35</b>	240,-

Information on prism constants can be found at [page 8 and 9](#).

Description	prism constant K	Order-No.	Euro
Holder HIP, 2 x 5/8" with reflective foil	<b>0</b> (Leica = +34,4 mm)	<b>1615.0</b>	123,-

#### MORE OPTIONS



#### ■ Tilting axis pins

- see [page 13](#)

#### ■ Red marked prism center

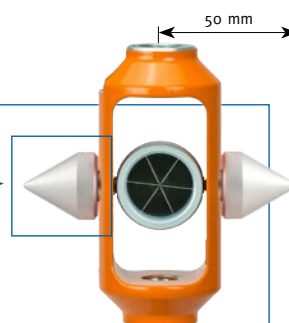
- see [page 13](#)

#### ■ Circular Level

- see [page 39](#)

#### ■ Offset spikes

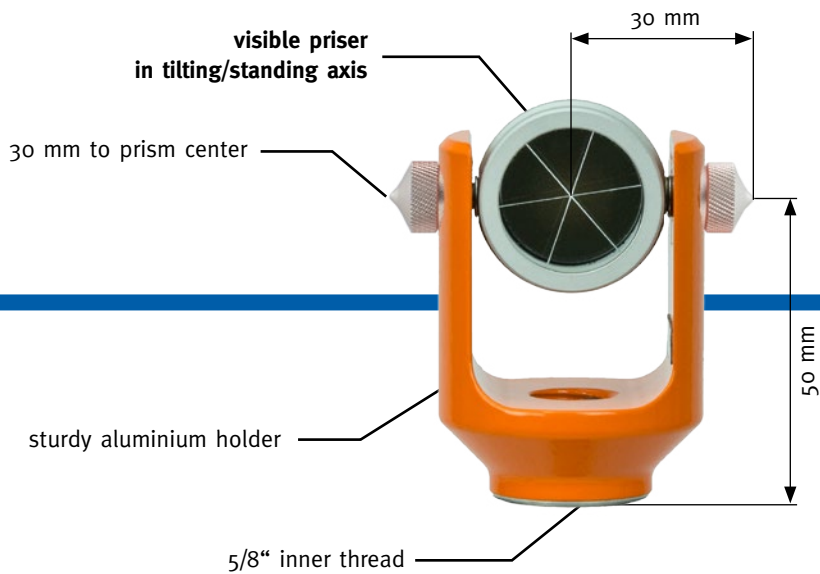
- see [page 18](#)





Prism HIP-U 5/8"

■ Prism holder with U-Design



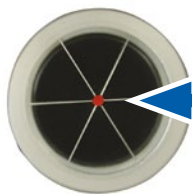
Description	Ø glass prism	prism constant K	Order-No.	Euro
Prism HIP-U 5/8"	17,5 mm	-11,3 (Leica = +23,1) mm	1620.11	160,-
	25 mm	-16,9 (Leica = +17,5) mm	1620.17	160,-
	25 mm	-30 (Leica = +4,4) mm	1620.30	185,-
	25 mm	-34,4 (Leica = +0) mm	1620.34	190,-
	25 mm	-35,0 (Leica = -0,6) mm	1620.35	190,-

Information on prism constants can be found at [page 8 and 9](#).



Description	prism constant K	Order-No.	Euro
Holder HIP-U 5/8" with reflective foil	0 (Leica = +34,4 mm)	1625.0	75,-

MORE OPTIONS



■ Tilting axis pins

- see [page 13](#)

■ Red marked prism center

- see [page 13](#)

■ Offset spikes

- see [page 18](#)

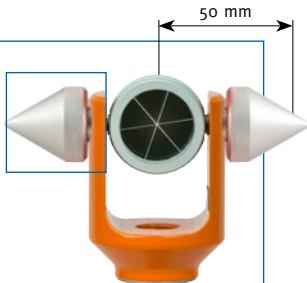


Table of contents



Print page

previous page



next page

step back

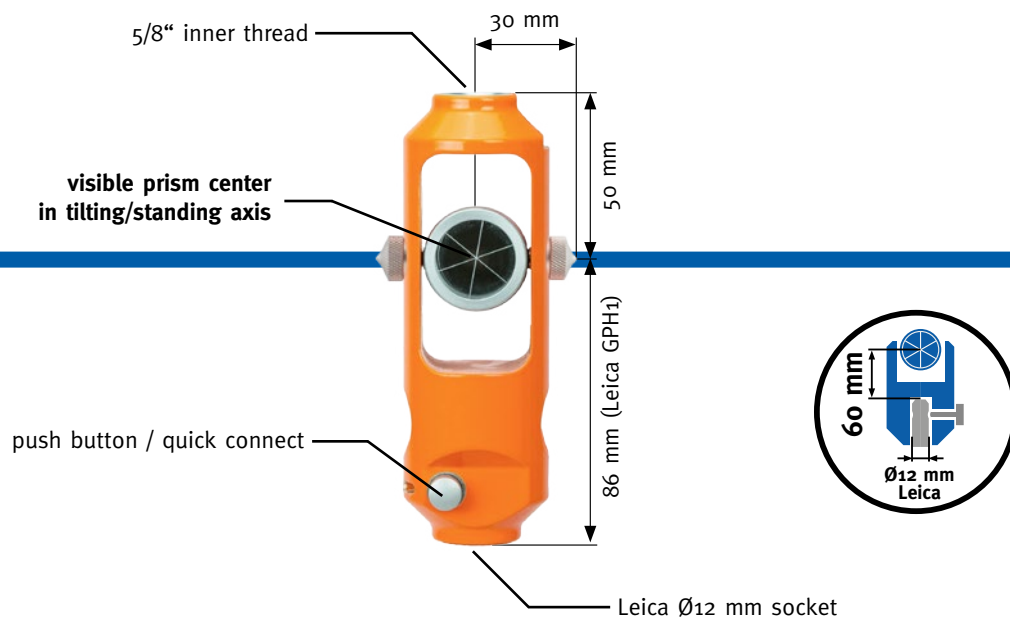


step forward

# Prism HIP with Leica socket

## Prism HIP Leica - 5/8"

### ■ Prism Holder with closed design



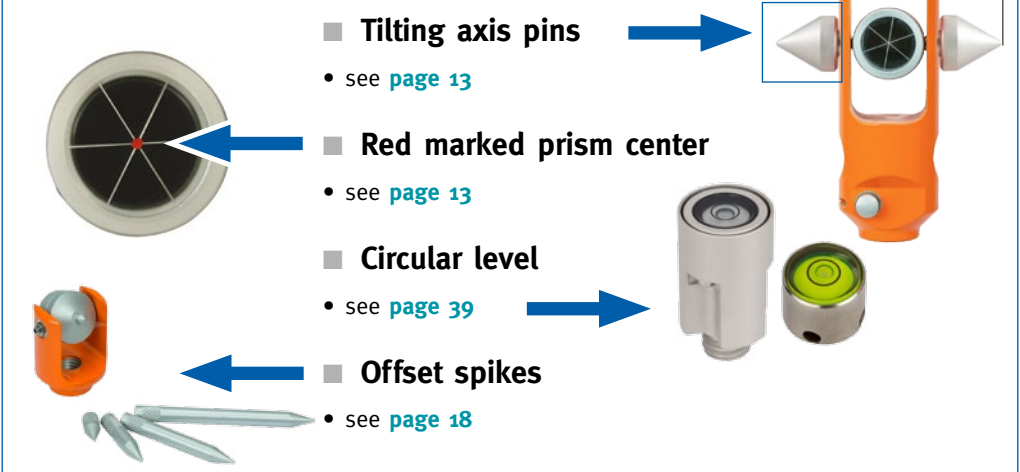
Description	Ø glass prism	prism constant K	Order-No.	Euro
Prism HIP Leica-5/8"	17,5 mm	<b>-11,3</b> (Leica = +23,1) mm	<b>1630.11</b>	230,-
	25 mm	<b>-16,9</b> (Leica = +17,5) mm	<b>1630.17</b>	230,-
	25 mm	<b>-30</b> (Leica = +4,4) mm	<b>1630.30</b>	255,-
	25 mm	<b>-34,4</b> (Leica = +0) mm	<b>1630.34</b>	260,-
	25 mm	<b>-35,0</b> (Leica = -0,6) mm	<b>1630.35</b>	260,-

Information on prism constants can be found at [page 8 and 9](#).

Description	prism constant K	Order-No.	Euro
Holder HIP Leica-5/8", with reflective foil	<b>0</b> (Leica = +34,4 mm)	<b>1635.0</b>	149,-

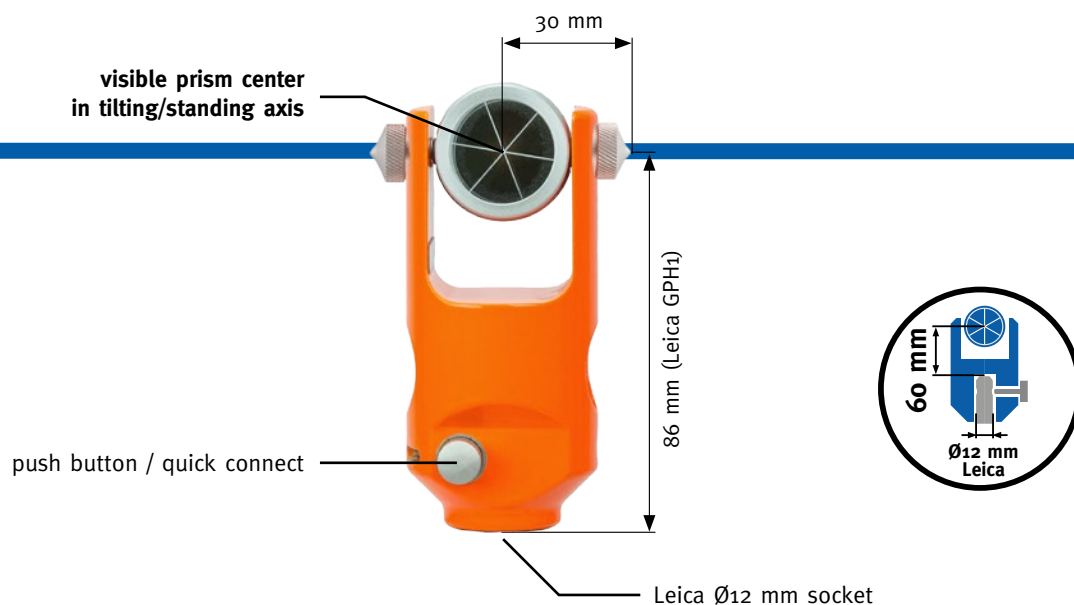


### MORE OPTIONS



## Prism HIP-U Leica

### ■ Prism holder with U-Design



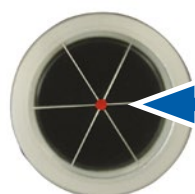
Description	Ø glass prism	prism constant K	Order-No.	Euro
Prism HIP-U Leica	17,5 mm	<b>-11,3</b> (Leica = +23,1) mm	<b>1640.11</b>	185,-
	25 mm	<b>-16,9</b> (Leica = +17,5) mm	<b>1640.17</b>	185,-
	25 mm	<b>-30</b> (Leica = +4,4) mm	<b>1640.30</b>	210,-
	25 mm	<b>-34,4</b> (Leica = +0) mm	<b>1640.34</b>	215,-
	25 mm	<b>-35,0</b> (Leica = -0,6) mm	<b>1640.35</b>	215,-

Information on prism constants can be found at [page 8](#) and [9](#).

Description	prism constant K	Order-No.	Euro
HIP-U Leica with reflective foil	<b>0</b> (Leica = +34,4 mm)	<b>1645.0</b>	100,-



#### MORE OPTIONS



#### ■ Tilting axis pins

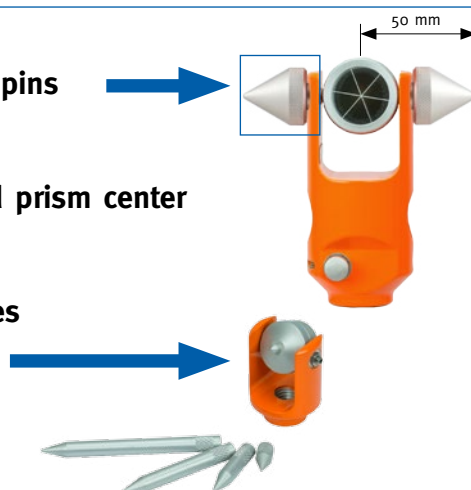
- see [page 13](#)

#### ■ Red marked prism center

- see [page 13](#)

#### ■ Offset spikes

- see [page 18](#)



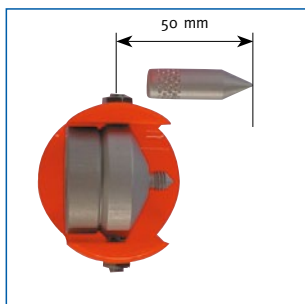


## Offset spikes

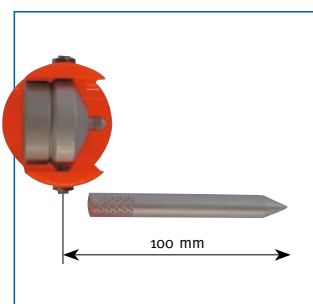
### For HIP prisms with glass prism

HD 50 and HD 100 for measuring vertical points, e.g. building facades, etc.  
Can be screwed onto the rear M6 thread of the prism housing.

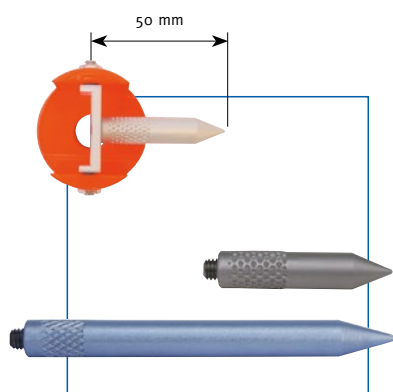
Available for each system constant to achieve a round distance (= longitudinal eccentricity) to the mandrel tip (object point).



Longitudinal eccentricity/improvement <b>+50 mm</b>			
Description	prism constant set on the tachymeter	Order-No.	Euro
Offset spike / tip HD50/11	<b>-11,3</b> (Leica = +23,1) mm	<b>1650.39</b>	7,50
Offset spike / tip HD50/16	<b>-16,9</b> (Leica = +17,5) mm	<b>1415.34</b>	7,50
Offset spike / tip HD50/30	<b>-30,0</b> (Leica = +4,4) mm	<b>1650.20</b>	7,50
Offset spike / tip HD50/34	<b>-34,4</b> (Leica = 0) mm	<b>1650.16</b>	7,50
Offset spike / tip HD50/35	<b>-35,0</b> (Leica = -0,6) mm	<b>1650.15</b>	7,50



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



### For holder with reflective foil

The offset spike is screwed into the back of the tiltable target mark carrier.  
When measuring a point with the offset spike, a **longitudinal eccentricity (improvement) of +50 mm / + 100 mm** is to be considered.

Description	Order-No.	Euro
Offset spike / tip RD 50, Longitudinal eccentricity + 50 mm	<b>1029.50</b>	8,50
Offset spike / tip RD 100, Longitudinal eccentricity + 100 mm	<b>1029.100</b>	8,50


[Table of contents](#)

[Print page](#)
[previous page](#)

[next page](#)
[step back](#)

[step forward](#)



# Prisms, Holders, Accessories

## Holder series ONRT for MP24

Page 1 of 2

### A.2.1 Mini Prism MP 24

Page 21



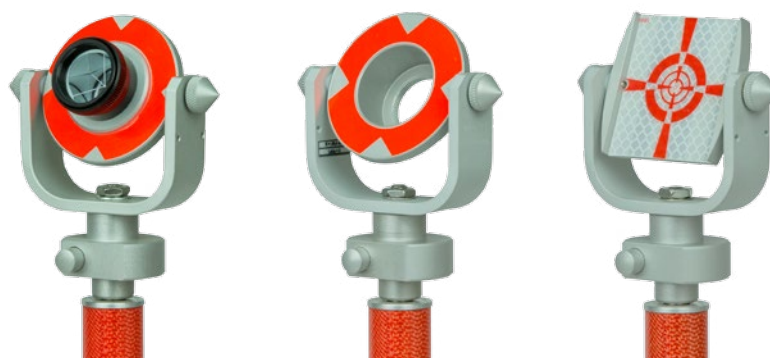
### A.2.2 Holder with 5/8" threads

Page 22



### A.2.3 Holder with Leica socket

Page 23



### A.2.4 Offset spikes for series TOP and ONRT

Page 24



# Prisms, Holder, Accessories

## ■ Holder ONRT for MP24

Page 2 of 2

A.2.5 Use MP 24 on the ranging pole

Page 25



Table of contents



Print page

previous page



next page

step back

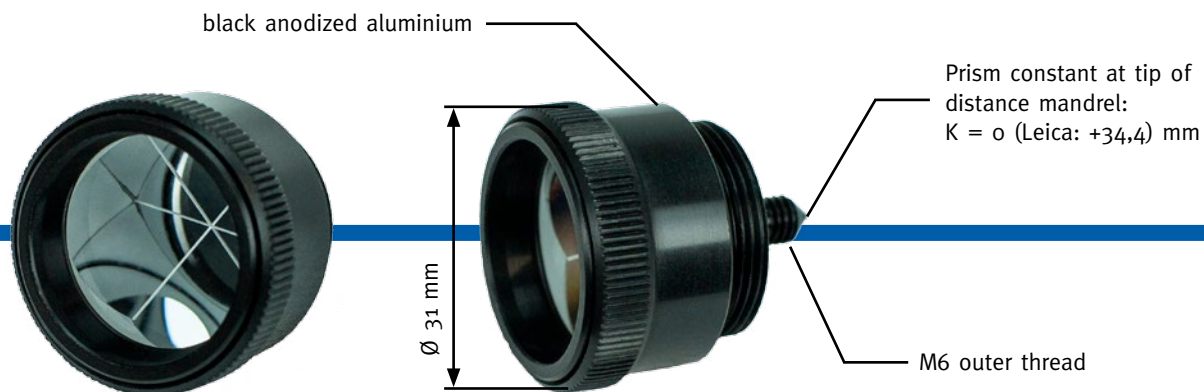


step forward

## 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

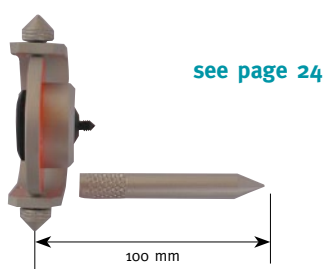


Description	Order-No.	Euro
Mini Prism MP 24	1400	95,-

### INFO

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

## Offset spikes



## MP24 in closed design holder



### ON REQUEST

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



Table of contents



Print page

previous page



next page

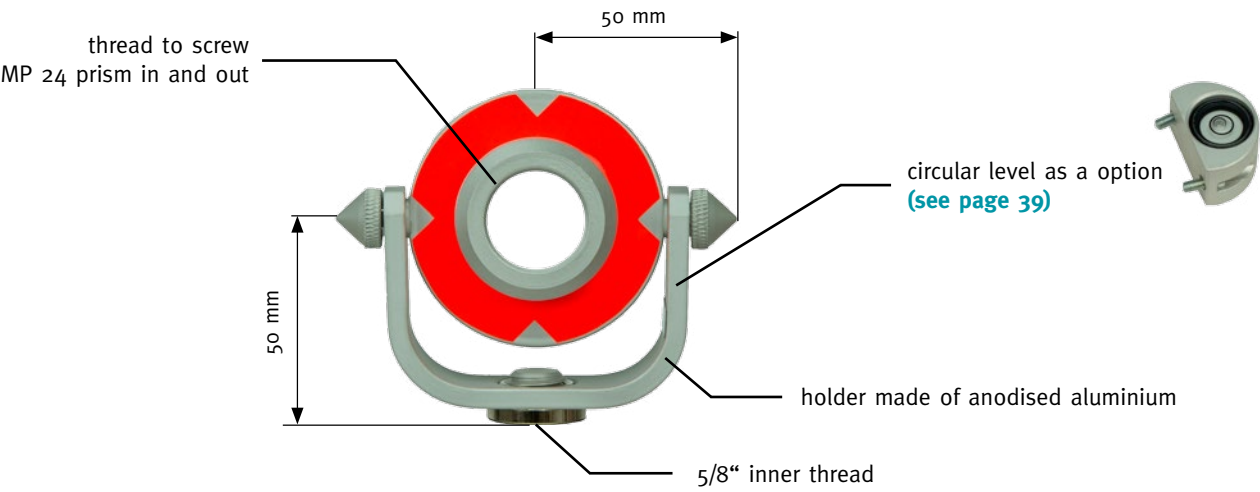
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Prism Holder Type ONRT 50

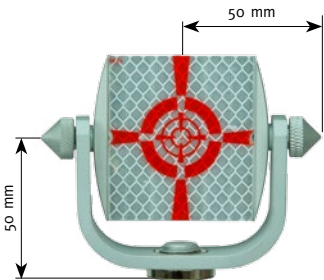
■ U-shaped prism holder with 50 mm tilting axis height



Description	prism constant K	Order-No.	Euro
Holder ONRT 50, for MP 24 prism (without prism)	0 (Leica = +34,4 mm)	0625.0	74,50
	-11,3 (Leica = +23,1 mm)	0625.11	74,50
	-16,9 (Leica = +17,5 mm)	0625.17	74,50
	-30,0 (Leica = +4,4 mm)	0625.30	74,50
	-34,4 (Leica = 0 mm)	0625.34	74,50
	-35,0 (Leica = -0,6 mm)	0625.35	74,50

INFO

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



■ With reflective foil 52 x 60 mm

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

Description	prism constant K	Order-No.	Euro
Holder ONRT 50, with reflective foil	0 (Leica = +34,4 mm)	0628	65,-



Table of contents



Print page

previous



next page

step back

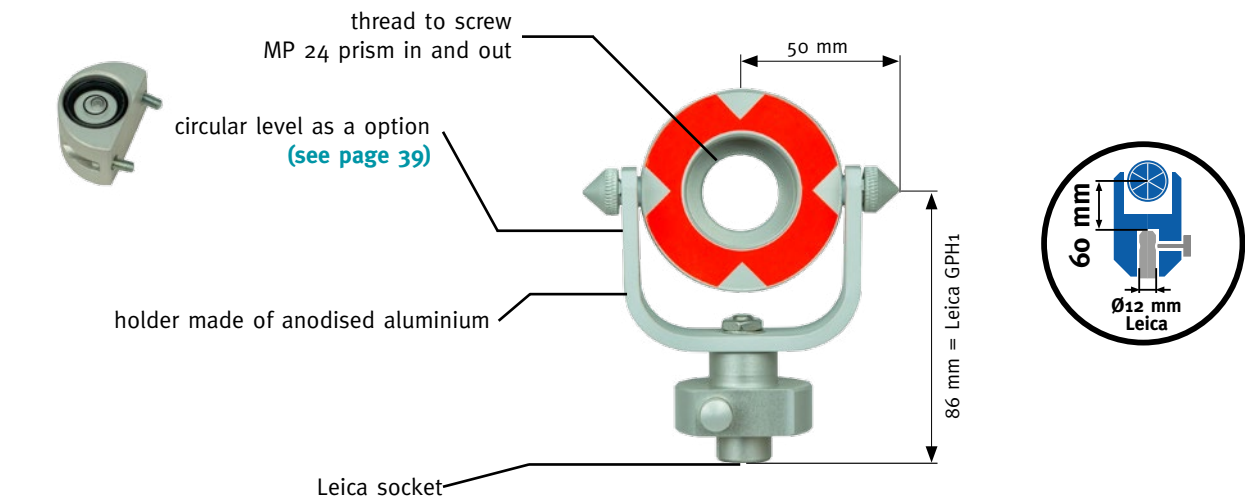


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Prism Holder Type ONRT L

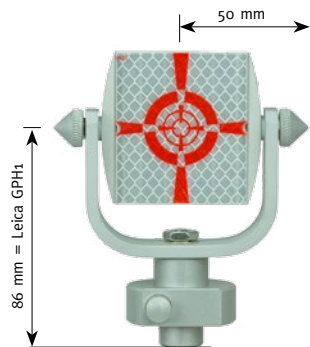
■ U-shaped prism holder



Description	prism constant K	Order-No.	Euro
Holder ONRT L, for prism MP 24 (without prism)	0 (Leica = +34,4 mm)	0655.0	102,-
	-11,3 (Leica = +23,1) mm	0655.11	102,-
	-16,9 (Leica = +17,5) mm	0655.17	102,-
	-30,0 (Leica = +4,4) mm	0655.30	102,-
	-34,4 (Leica = 0) mm	0655.34	102,-
	-35,0 (Leica = -0,6) mm	0655.35	102,-

INFO

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



■ With reflective foil 52 x 60 mm

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

Description	prism constant K	Order-No.	Euro
Holder ONRT L, with reflective foil	0 (Leica = +34,4 mm)	0658	91,-

## Accessories for series TOP and Type ONRT

### Offset spikes for prism MP24

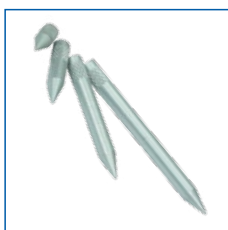
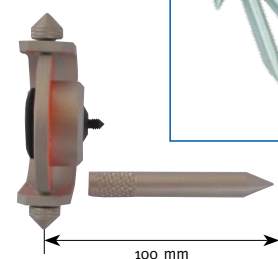
For measuring vertical points, e.g. building facades, etc.

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 longitudinal eccentricity of the (true) prism constant with a positive sign set on the tachymeter shall be taken into account for the measured distance.



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

Description	prism constant K	Order-No.	Euro
Offset spike MPV50/0	0 (Leica = +34,4) mm	1415.50	7,50
Offset spike MPV50/11	-11,3 (Leica = +23,1) mm	1415.39	7,50
Offset spike MPV50/16	-16,9 (Leica = +17,5) mm	1415.34	7,50
Offset spike MPV50/30	-30,0 (Leica = +4,4) mm	1415.20	7,50
Offset spike MPV50/34	-34,4 (Leica = 0) mm	1415.16	7,50
Offset spike MPV50/35	-35,0 (Leica = -0,6) mm	1415.15	7,50

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

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

### For holder with reflective foil

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

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

Description	Order-No.	Euro
Offset spike RD 50, Longitudinal eccentricity +50 mm	1029.50	8,50
Offset spike RD 100, Longitudinal eccentricity +100 mm	1029.100	8,50



Table of contents



Print page

previous



next page

step back



step forward

## 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 (improvement)
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

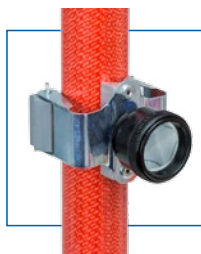


### Ranging pole clamp with level for Mini Prism MP 24

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)	<b>0930</b>	32,-



### 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)	<b>0910</b>	14,-

#### 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.


[Table of contents](#)

[Print page](#)
[previous page](#)

[next page](#)
[step back](#)

[step forward](#)

## Cylinder Prism ZP11

Compact, precise, sturdy, multifunctional, inexpensive

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



Connection bolt B1216

Alternative: M6 inner thread

Securing option 1:  
Plastic knurled screw

back side

Securing option 1:  
Allen screw (SW3)



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	<b>6611</b>	150,-

### 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	<b>6611.M6</b>	135,-



## Accessories for ZP11 prisms

### Cylinder prism ZP11 on prism pole

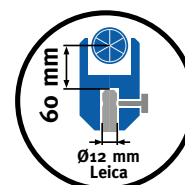
#### ■ Adapter for prism poles with 5/8" inner thread and 150 mm target height

- 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	<b>6622</b>	37,-

#### ■ 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	<b>0697</b>	60,-

### 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	<b>6621</b>	32,-

#### ■ Adapter for tribrach inserts with Leica bolt

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

### More Accessories

Circular level for Cylinder Prism ZP11 [s. page 89](#)



Stakeout spikes for Cylinder Prism ZP11 [s. page 89](#)



Table of contents



Print page

previous



next page

step back



step forward



## Modular System & Securing Options

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

### Two securing options:

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

Allen key (SW3)



## Application Possibilities

### As a Monitoring Prism on a L-Carrier

s. page 75



### As a Twin-Prism

s. page 79

### As a modular mini vector

s. page 88



### As monitoring point vertically above a point

s. page 82



Table of contents



Print page

previous



next page

step back



step forward

# Prism, Holder, Accessories

## ■ 360° Prisms

Page 1 of 1

### A.4.1 RUNDUM-"Prism" 6x60°

page 30



### A.4.2 360°-Prism Bo Medium Format

page 31



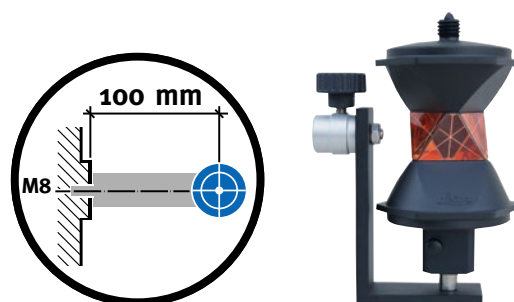
### A.4.3 Accessories for Leica 360°-Mini Prism GRZ101

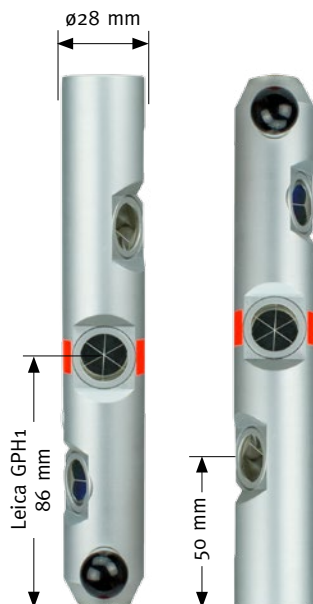
page 35



### A.4.4 Accessories for Leica 360°-Prism GZR4, GRZ121, GRZ122

page 37





## 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  $K = -11,3 \text{ mm}$  (Leica =  $+23,1 \text{ mm}$ ), therefore identical with the Leica-360°-prisms GRZ4, GRZ121 and GRZ122

- 6 precision prisms (not tiltable),  $\varnothing 17,5 \text{ mm}$ , 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  $\varnothing 12 \text{ mm}$  (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	<b>5660.27</b>	630,-

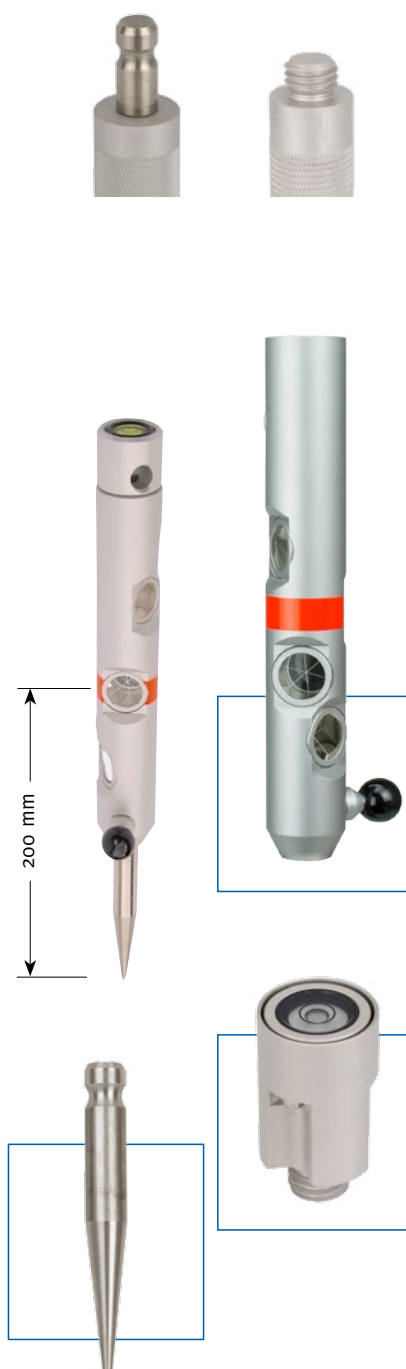
## Accessories

Description	Order-No.	Euro
Adjustable circular level 5/8", accuracy 30'	<b>1587.30</b>	40,50

Other circular levels [see page 39](#)

Description	Order-No.	Euro
Stakeout tip Leica, $\varnothing 12 \times 140 \text{ mm}$ , Höhe 200 mm	<b>1858.140</b>	38,-

Other stakeout tips [see page 44](#)

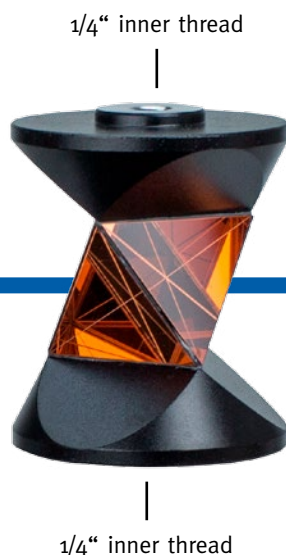




## 360°-Prisma Bo Medium Format

### ■ 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	<b>5670</b>	450,-

## Adapter

### 5/8" inner thread to 1/4" outer thread

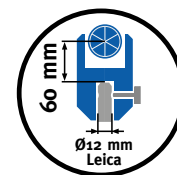
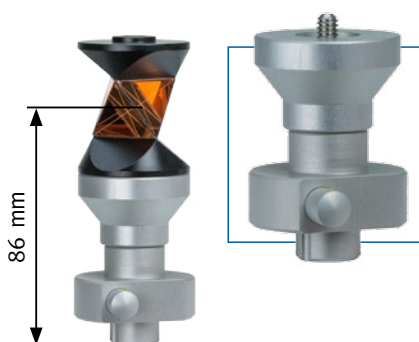
- Target height (to prism center): 50 mm
- Anodised aluminium, Ø 40/25 x 26 mm



Description	Order-No.	Euro
5/8"-Adapter for 360°-Prism Bo Medium Format	<b>5676</b>	35,-

### 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	<b>5673.LS</b>	75,-

## 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'	<b>5672</b>	45,-

### ■ Sensitivity 50'

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

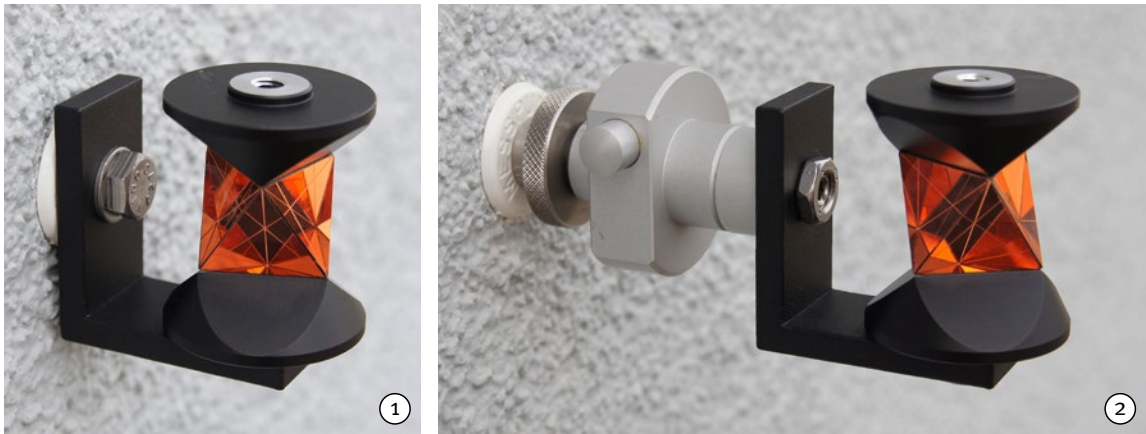


Description	Order-No.	Euro
Circular level, 1/4" outer thread, sensitivity 50'	<b>5682.K</b>	30,-

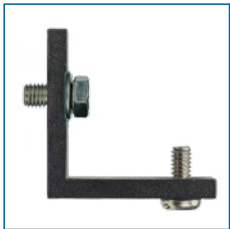
### INFO

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



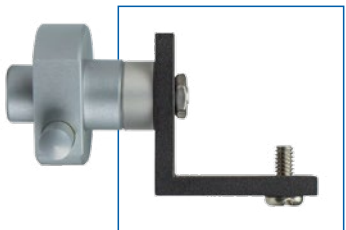
■ With M8 screw [Fig. 1]



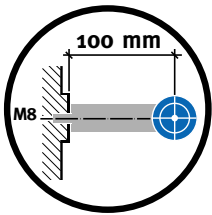
- Minimum distance to the wall
- L-Holder made of aluminium with M8 hexagon head screw and washer
- 1/4" outer thread for screwing on the 360° prism
- Target height (distance to wall bolt) 40 mm

Description	Order-No.	Euro
L-Holder with M8 screw, 1/4" thread, target height = 40 mm	5677.M8	51,-

■ With Leica push-button socket [Fig. 2]

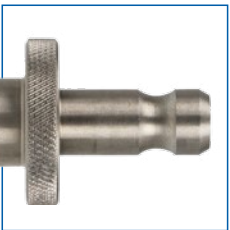


- L-Holder made of aluminium with Leica socket Ø 12 mm
- Push button for quick change and securing on the bolt
- 1/4" outer thread for screwing on the 360° prism
- **Distance to wall bolt = 100 mm** (when using the wall adapter WA Leica)
- Target height = 86 mm



Description	Order-No.	Euro
L-Holder, Leica socket, 1/4" thread, target height 86 mm	5677.LS	75,-

■ Wall adapter WA Leica (stainless steel) [see page 41](#)



- **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	17,-

INFO

Wall bolt [see page 83](#)



Magnetic Quick Change Connection

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

- L-Holder made of aluminium
- For centering plates with Ø 33 / Ø 40 mm
- For quick application / removal of the prism in seconds
- 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	79,-
L-Holder with magnetic base Ø 40 mm, target height 50 mm	5671.M40	79,-



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



INFO

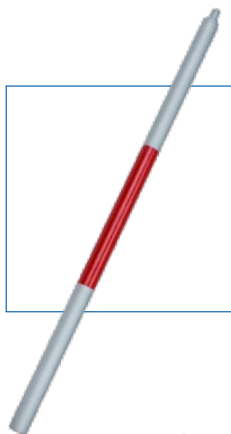
M8-centering plates Ø 33 and Ø 40 mm [see page 85](#)



### ■ 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	<b>5670.S</b>	12,-



### ■ 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	<b>5670.V</b>	10,-



### ■ 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	<b>5670.V4S</b>	50,-



### ■ 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	<b>5670.D</b>	15,-

### 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

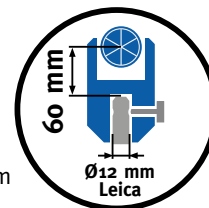
Description	Order-No.	Euro
5/8"-Adapter for Leica 360° Mini Prism GRZ101	<b>5686</b>	28,-



### Leica-Adapter

#### ■ Push-Button / 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	<b>5683.LS</b>	65,-



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'	<b>5682.Ki</b>	28,-

#### 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



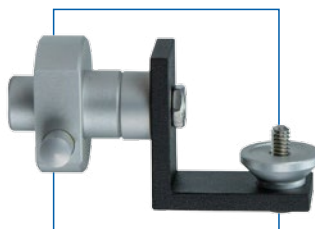
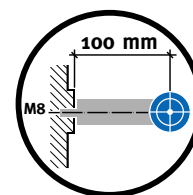
Description	Order-No.	Euro
L-holder w. M8 screw, 1/4" thread, target height 40 mm	<b>5687.M8</b>	59,-

**INFO** Wall bolts [see page 83](#)



### ■ Mit Leica Druckknopf-Anschluss

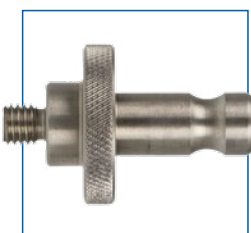
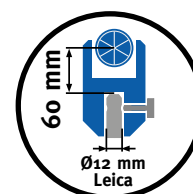
- Aluminium L-holder with Leica socket connection Ø 12 mm
- Push button for quick change and securing on Leica spigot
- 1/4" outer thread to screw on 360° prism
- Target height = 86 mm
- **Distance from wall bolt = 100 mm** (when using the WA Leica adapter)



Description	Order-No.	Euro
L-holder, Leica push button socket, 1/4" thread, target height 86 mm	<b>5687.LS</b>	83,-

### ■ Wall adapter WA Leica [see page 41](#)

- 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	<b>0830</b>	17,-



Table of  
contents



Print  
page

previous  
page



next  
page

step  
back



step  
forward

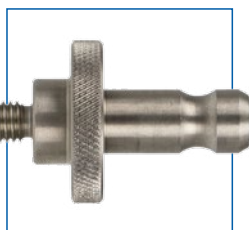
## Accessories: Leica 360°- Prisma GRZ 4, 121, 122

### 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)

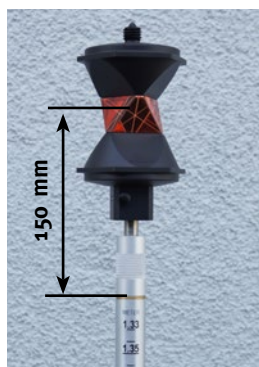
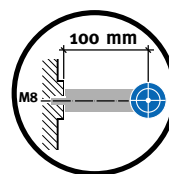
Description	Order-No.	Euro
L-holder, Leica socket with securing screw, Leica spigot Ø 12 x 40 mm	<b>5690</b>	145,-



### ■ Wall Adapter WA Leica (stainless steel) [see page 41](#)

- 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	<b>0830</b>	17,-



### 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 [page 192](#)



Table of contents



Print page

previous



next page

step back



step forward

# Prisms, Holder, Accessories

## ■ Accessories

### A.5.1 Circular Levels

page 39



### A.5.2 Adapter Leica, 5/8"

page 40



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

page 42



### A.5.4 Extension 50 mm, Handgrip, Mini Tripod, Joint Tripod

page 45



## 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	<b>1580</b>	23,-

### 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'	<b>1584</b>	25,50

### 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'	<b>1585.30</b>	25,50

#### ■ Adjustable

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



Description	Order-No.	Euro
Circular level, adjustable, sensitivity 30'	<b>1587.30</b>	40,50
Circular level, adjustable, sensitivity 10'	<b>1587.10</b>	43,50

### Circular level for Prism Type ONRT



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



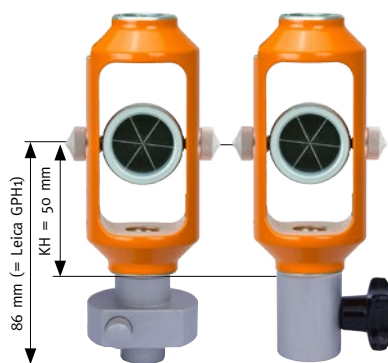
Description	Order-No.	Euro
Circular level JDL 14	<b>1850</b>	34,-


[Table of contents](#)

[Print page](#)
[previous page](#)

[next page](#)
[step back](#)

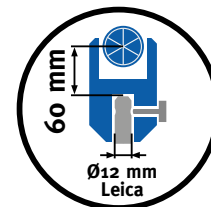
[step forward](#)



## 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 [see page 41](#).



### 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	<b>0690</b>	48,-



### 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)	<b>0302.27</b>	28,-
Adapter Leica St 40 - 5/8" ( <b>only for 40 mm spigots</b> )	<b>0302.40</b>	29,-



### 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	<b>0377.27</b>	29,-
	40 mm	60 mm	<b>0377.40</b>	31,-



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	<b>0378.27</b>	29,-
	40 mm	60 mm	<b>0378.40</b>	31,-


[Table of contents](#)

[Print page](#)
[previous page](#)

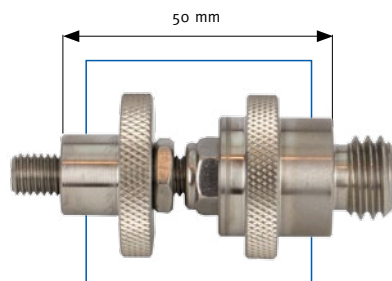
[next page](#)
[step back](#)

[step forward](#)



## Adapter M8 – 5/8"

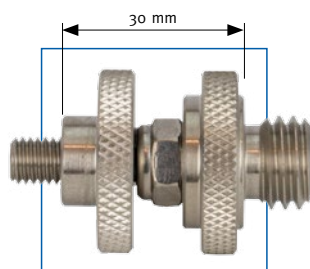
- Side 1: 5/8" outer thread to connect prism holders
- Side 2: M8 outer thread to screw in common wall bolts
- One common axis -> independently rotatable around this axis
- Rotation resistance can be adjusted with self-locking hexagon nut (SW 13)
- Large knurls for safe insertion without tools
- Screwing-in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



### ■ For Prisms with 50 mm Tilting Axis Height

Description	Order-No.	Euro
Adapter WA 50, M8 - 5/8", L = 50 mm	<b>o810</b>	41,-

#### Examples



### ■ For Prisms with 70 mm Tilting Axis Height

Description	Order-No.	Euro
Adapter WA 30, M8 - 5/8", L = 30 mm	<b>o820</b>	41,-

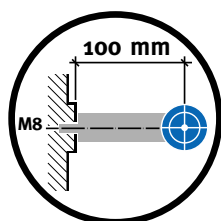
## Adapter M8 – Leica Ø 12 mm

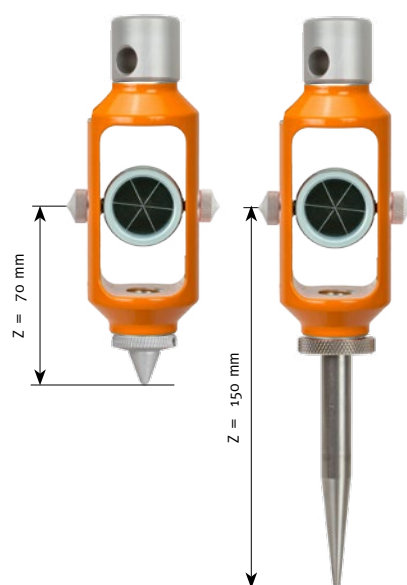
For tiltable reflector holders with Leica spigot Ø 12 mm.

- 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	<b>o830</b>	17,-





## Stakeout spikes

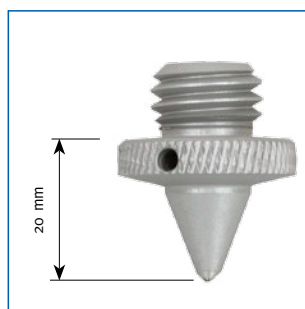
For all reflector holders with 5/8" inner thread or Leica spigot. Due to the small distance between prism center and stakeout tip, points (in conjunction with a circular level) can be staked out or measured with great accuracy.

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.

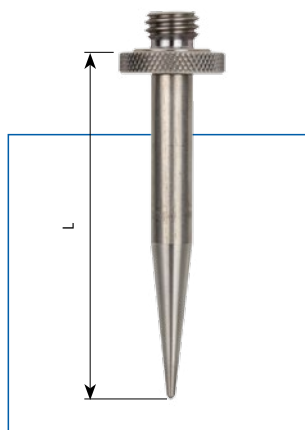


Description	Order-No.	Euro
Stakeout tip 5/8", L = 20 mm	<b>1852</b>	20,-

#### ■ 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	<b>1859.100</b>	32,-
Stakeout spike 5/8", steel, L = 100 mm	150 mm	<b>1859.150</b>	35,-
Stakeout spike 5/8", steel, L = 150 mm	200 mm	<b>1859.200</b>	40,-


[Table of contents](#)

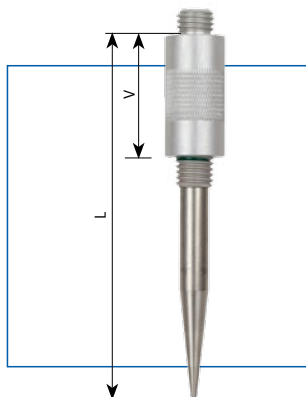
[Print page](#)
[previous page](#)

[next page](#)
[step back](#)

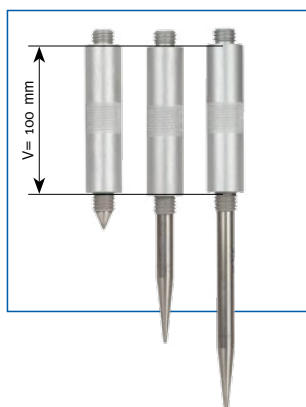
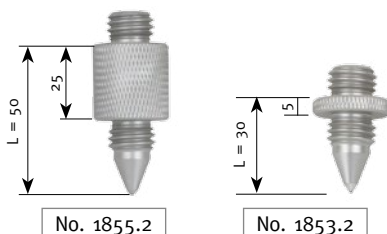
[step forward](#)

### ■ 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	<b>1853.2</b>	22,-
Stakeout spike 5/8", L = 40 mm	15 mm	90 mm	<b>1854.2</b>	24,-
Stakeout spike 5/8", L = 50 mm	25 mm	100 mm	<b>1855.2</b>	26,-
Stakeout spike 5/8", L = 75 mm	50 mm	125 mm	<b>1856.75</b>	30,-
Stakeout spike 5/8", L = 150 mm	50 mm	200 mm	<b>1856.150</b>	40,-
Stakeout spike 5/8", L = 200 mm	50 mm	250 mm	<b>1856.200</b>	45,-



### ■ 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	<b>1851.125</b>	45,-
Stakeout spike 5/8", L = 200 mm	100 mm	250 mm	<b>1851.200</b>	50,-
Stakeout spike 5/8", L = 250 mm	100 mm	300 mm	<b>1851.250</b>	55,-

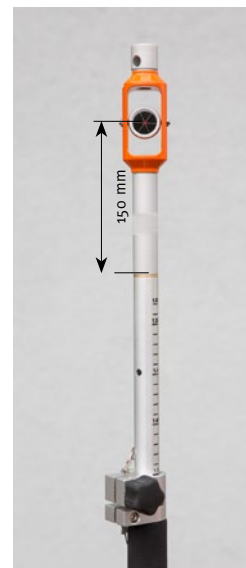
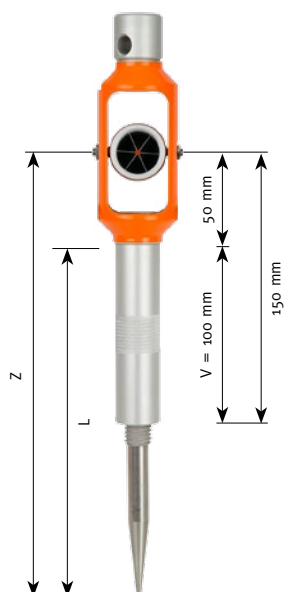


Table of contents



Print page

previous



next page

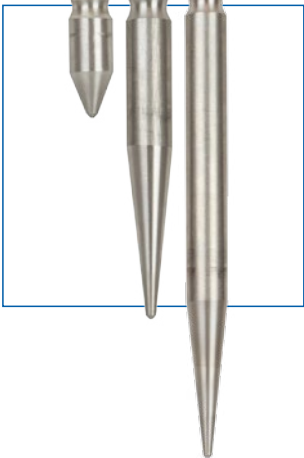
step back



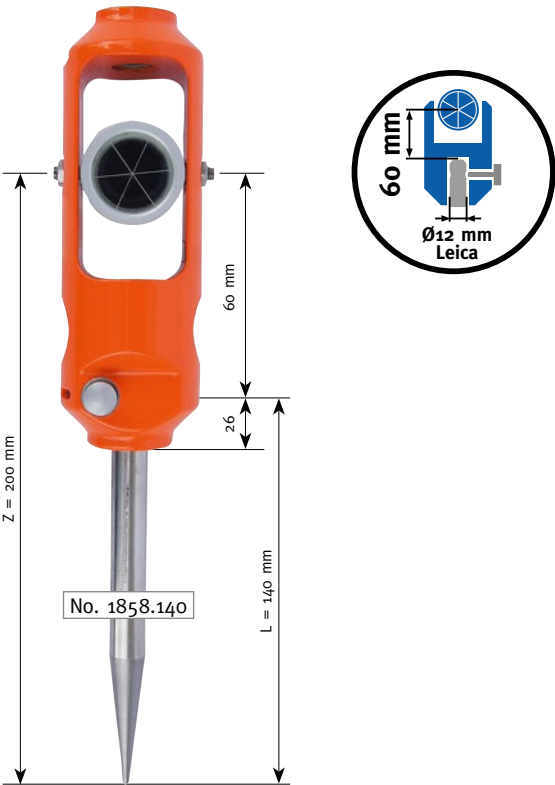
step forward

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	<b>1857.2H</b>	28,-
Stakeout spike Leica, L = 90 mm	150 mm	<b>1858.90</b>	36,-
Stakeout spike Leica, L = 140 mm	200 mm	<b>1858.140</b>	38,-
Stakeout spike Leica, L = 190 mm	250 mm	<b>1858.190</b>	43,-





## 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"	<b>0700</b>	27,-

### INFO

Any 5/8" extensions can be screwed between the handgrip and the prism.  
Extensions [see page 199](#).

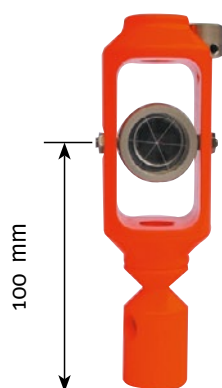


## Extension 50 mm

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	<b>0301.50</b>	24,50





## 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  $\varnothing$  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	<b>6270</b>	85,-
Mini tripod with pole clamp and rubber balls	<b>6272</b>	85,-



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	<b>6280</b>	150,-



## Tripod bases

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

Description	Order-No.	Euro
Claw clamp for joint tripod ( <a href="#">s. page 91</a> )	<b>5934</b>	60,-
Steel ring for joint tripod ( <a href="#">s. page 90</a> )	<b>5932</b>	35,-
Magnetic base for joint tripod ( <a href="#">s. page 91</a> )	<b>5930</b>	35,-
Suction holder, without vacuum indicator ( <a href="#">s page 92</a> )	<b>5936</b>	46,-
Suction holder, with vacuum indicator ( <a href="#">s. page 92</a> )	<b>5938</b>	76,-



Table of contents



Print page

previous



next page

step back



step forward

# Monitoring / Tunneling

## ■ Page 1 of 2

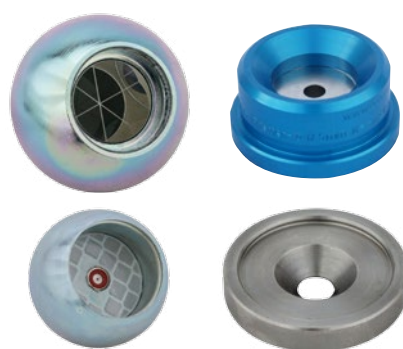
### B.1 General information about our Monitoring Systems

page 50



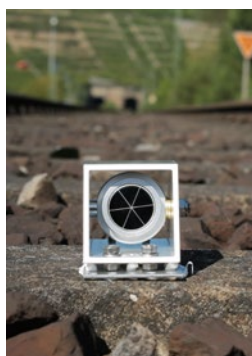
### B.2 Ball Prism - Monitoring System

page 51



### B.3 Rugged MoniPro System

page 69



### B.4 L-Bar Prisms

page 73





# Monitoring / Tunneling

## ■ Page 2 of 2

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

page 77



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

page 80



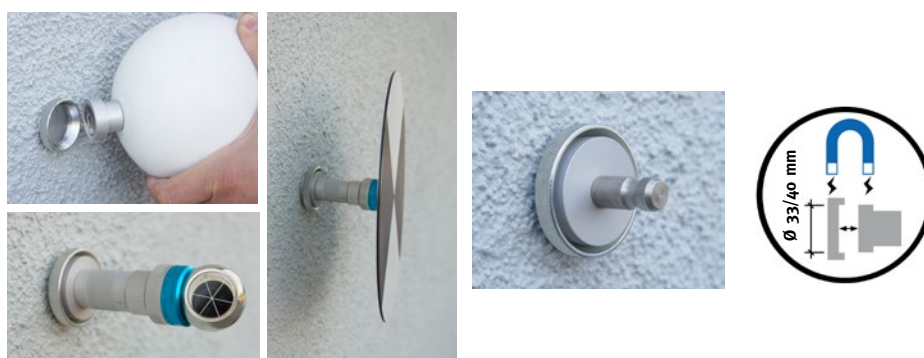
### B.7 M8 wall bolts as surveying points

page 83



### B.8 Magnetic quick change system with centering plate M8

page 85



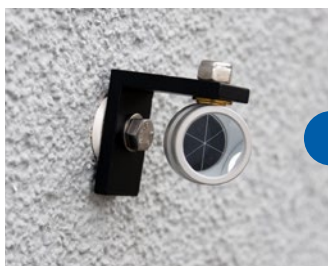
## Our Monitoring Systems in comparison



### 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: Ball prism, Base, Centering plate

## ■ Monitoring

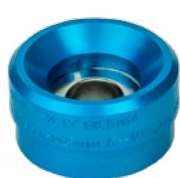
### B.2.1 Info / Ball Prisms

page 53



### B.2.2 Bases with integrated magnets / Bases with thread connection

page 58



### B.2.3 Centering plates

page 64



### B.2.4 Assembly adhesive and transport case

page 67

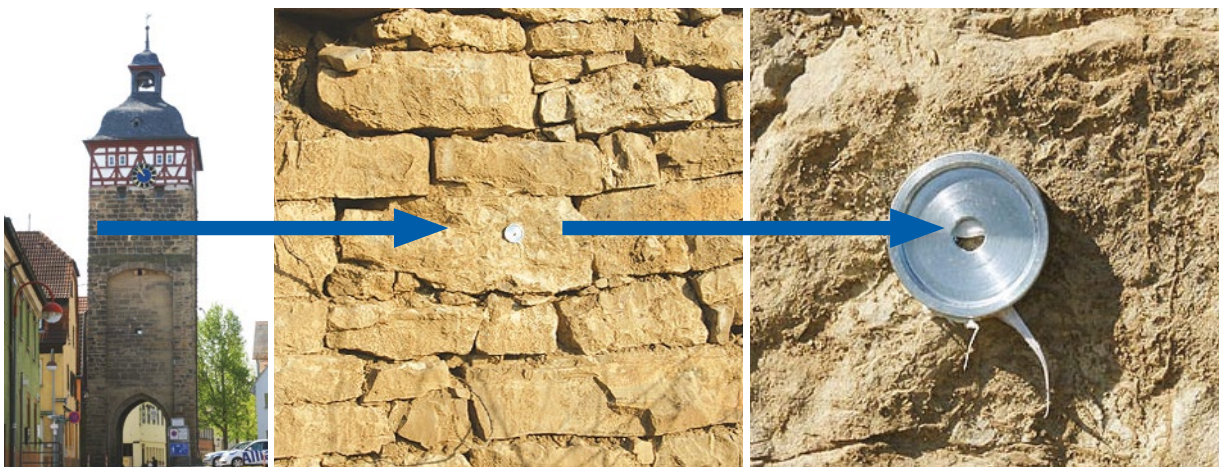




## APPLICATION EXAMPLE FLOODGATE RENOVATION



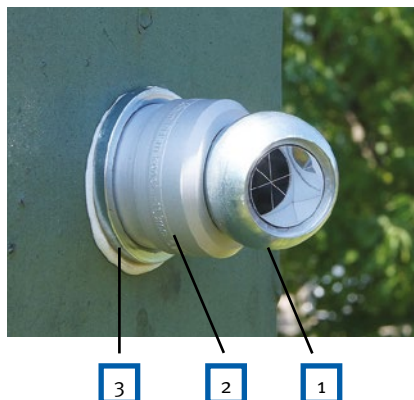
## APPLICATION EXAMPLE MONUMENT MONITORING



## APPLICATION EXAMPLE TRACK/RAIL MONITORING







## Monitoring: Ball Prism System

### Precise - universal - inexpensive

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

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



#### ■ Ball prisms / balls with reflective foil [1]

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

Available in two sizes: Outer ball- $\varnothing 30$  mm and  $\varnothing 1.5''$  (38,1 mm), which is also widely used in laser tracker applications. Ball- $\varnothing 30$  mm is available with prism constant  $K = 11,3$  mm,  $\varnothing 1.5''$  additionally with  $K = -16,9$  mm.

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



#### ■ Base / nest with integrated magnet [2]

On the cylindrical **ball base** with cone-shaped upper part, the ball prism comes to rest in a force-centred position and can be aligned in all directions over a  $180^\circ$  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  $H_0$ ) of 30.8 mm (or 25 mm for stainless steel bases) from its underside.**

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



#### ■ Centering plate [3]

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

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

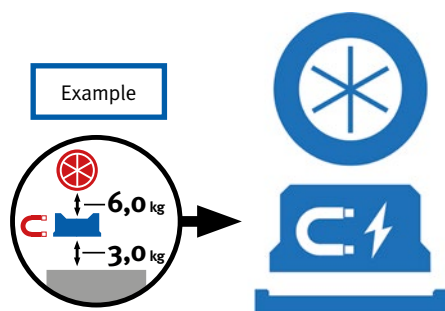
Instead of the centering plate, the base can also be attached directly to the object point. This can achieve a further increase in accuracy. However, this is usually far below the measurement accuracy that can be achieved with a tachymeter.

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

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

## The choice is yours

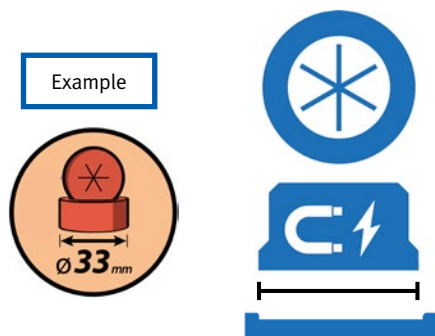
### Base / nest: strength of magnetic holding force



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

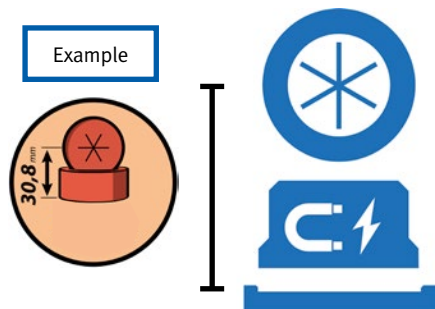
The use of bases with weak magnets in practice however has shown that although the prism remains reliably attached to the ball base, in certain applications the set direction towards the tachymeter can change when left unsupervised. For example during long-term monitoring on railroad-tracks. When a train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

### Base / nest: Base diameter



Our bases for the ball prisms with Ø1.5" are available in two diameters. Ø33 mm and Ø40 mm. The diameter describes the circular contact surface of the base in the direction of the object. The diameter itself has no effect on the measurement. Only thing that should be noted is, we offer **one** universal centring plate for the Ø40 mm bases and three different centring plates for the bases with Ø 33 mm. Please refer to the subchapter „Centering plates“ for the most appropriate centering plate for your application. Info: The Ø40 mm is based on existing products from the laser scanning industry. We have also developed the Ø33 mm in order to be able to offer a system that saves as much space as possible.

### Base / nest: Offsets



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

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

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

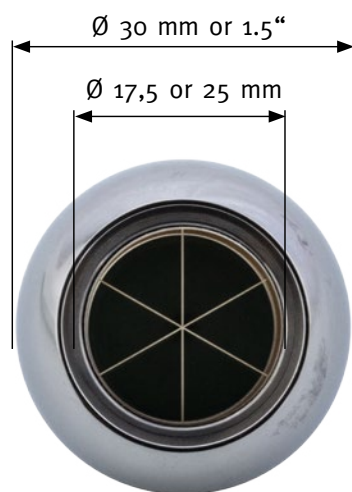
### Centering plates: Mounting options



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

## Ball prism: Diameters of the steel-sphere

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  $\pm 0.05$  mm. Other geometries, such as the position of the prism centre to the ball centre, height offsets and centering fits, have an accuracy of  $\pm 0.1$  to  $\pm 0.2$  mm.

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

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

## Ball prisms with test certificate

### ■ Highest accuracy - with tested prism constant

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

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

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

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

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

### Purchase ball prism with test certificate

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

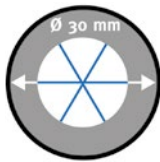
info@bohlenstingl.de



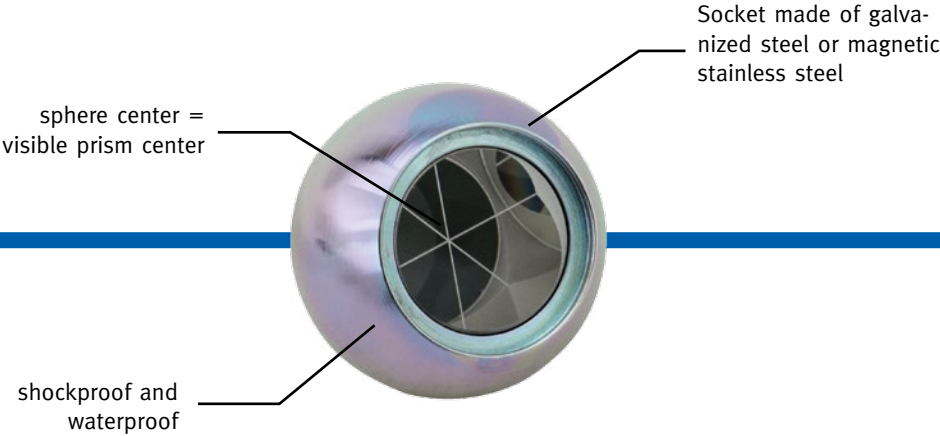




Ball Prism Ø 30 mm



- 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	123,-
	-	galvanized steel	1451	123,-
	M6 thread	stainless steel	1450.S	138,-
	-	polished stainless steel	1451.SP	148,-

■ Protective cap

A protective cap can be clipped onto the ball prisms. Info: [s. page 68](#).



Ball target Ø 30 mm with reflective foil



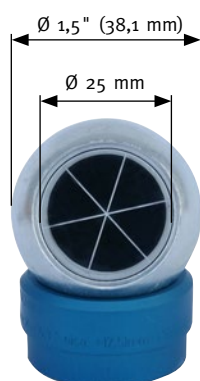
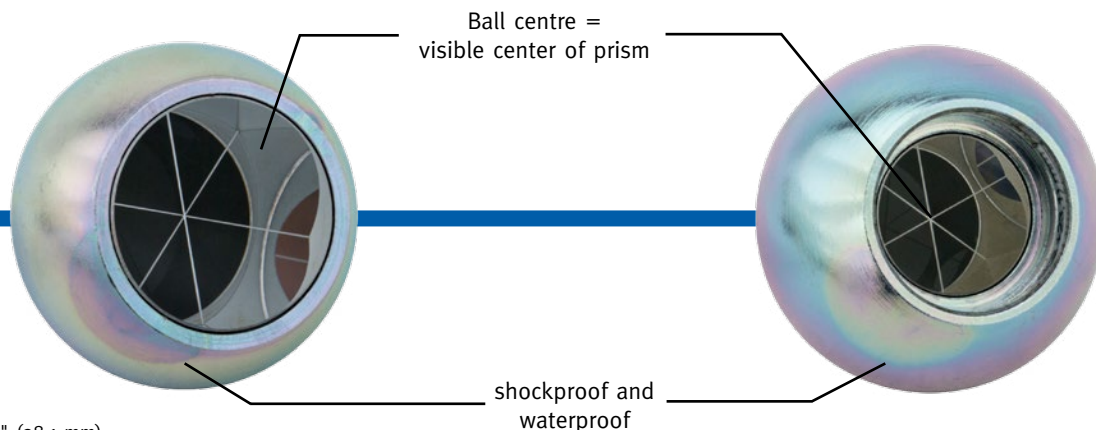
- For measurements at shorter distances and without automatic target acquisition
- Reflective foil applied in the axis / level of the ball centre
- Prism constant of K = 0 (Leica= +34.4) mm
- Target mark is exactly in center of the ball for highly accurate angle measurement
- Outer Ø reflective foil: 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	78,-
	stainless steel	1455.SP	103,-



## Ball prism Ø 1.5" (38,1 mm)

- Material of the ball: Galvanized steel or magnetic stainless steel
- Steel sphere-Ø 1.5":  $\pm 0,05$  mm
- Grinding accuracy of triple prism: 2"
- Reflective surfaces: Silver mirrored on the rear side
- Mounting of the prism in sphere:  $\pm 0,1$  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	<b>1445</b>	145,-
	stainless steel	<b>1445.S</b>	160,-

### ■ 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	<b>1453</b>	145,-
	stainless steel	<b>1453.S</b>	160,-

### ■ Protective cap

A protective cap can be clipped onto the 1453 and 1453.S ball prisms. Info: [s. page 68.](#)



## 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	<b>1447.S</b>	115,-

# Magnetic Ball Prism Monitoring System

## Thread base for Ø30 mm



With magnet and various thread connections [s. page 61](#)

## Thread base for Ø1.5"



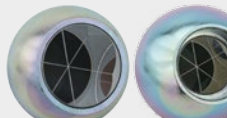
With magnet and various thread connections [s. page 61](#)

## Ø30 mm Ball Prism



With prism / reflective foil [s. page 56](#)

## Ø1.5" Ball Prism



With two prism constants or reflective foil [s. page 57](#)

## Base for ball prism Ø30 mm



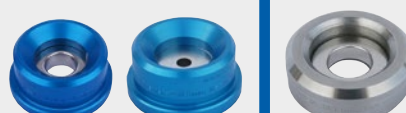
Magnetic holding force in three different strengths [s. page 59](#)

## Base for ball prism Ø1.5"

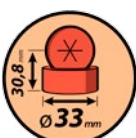


Magnetic holding force in two different strengths [s. page 60](#)

## Base for ball prism Ø1.5"



Magnetic holding force in two different strengths [s. page 60](#)



## Centering plate Ø33 mm



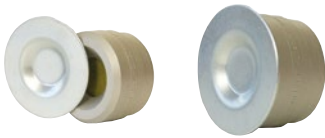
For adhesive bonding or screwing on [s. page 64](#)

## Centering plate Ø40 mm



For adhesive bonding or screwing on [s. page 66](#)



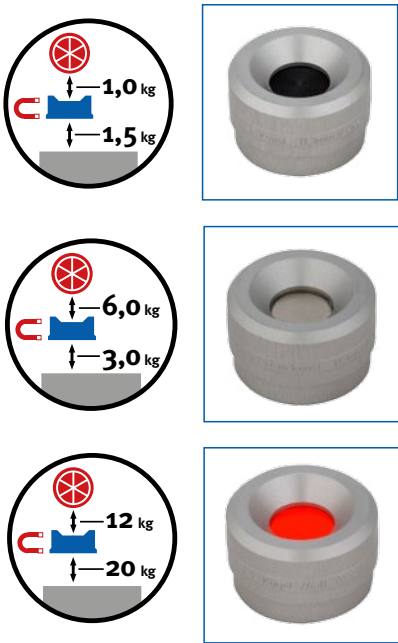
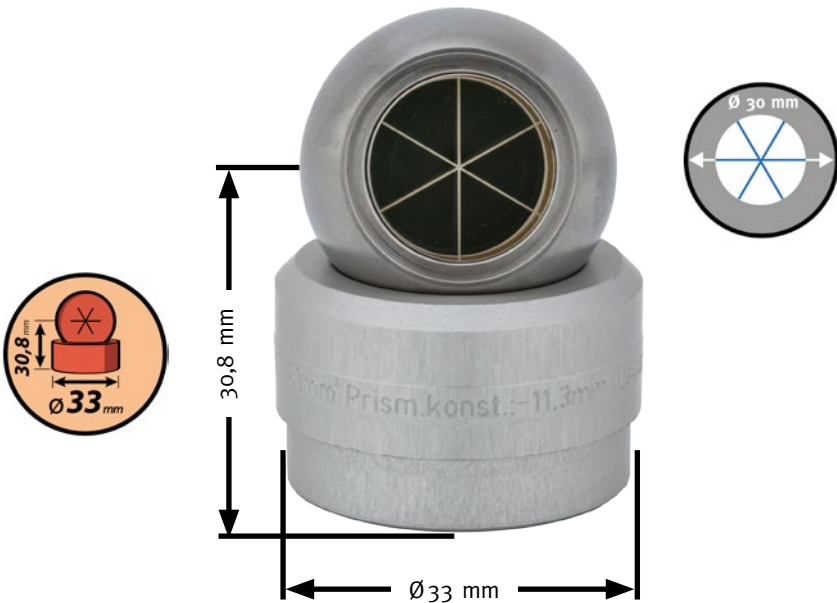


Base with integrated magnet for ball-Ø 30 mm

- 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	24,50
	approx. 6,0 / 3,0 kg	1460.S	32,-
	approx. 12,0 / 20,0 kg	1460.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 [page 62](#).



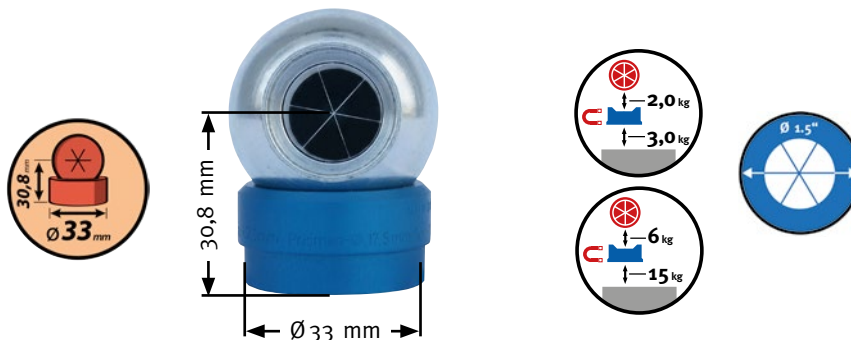


## Base with magnet for ball-Ø 1.5" (38,1 mm)

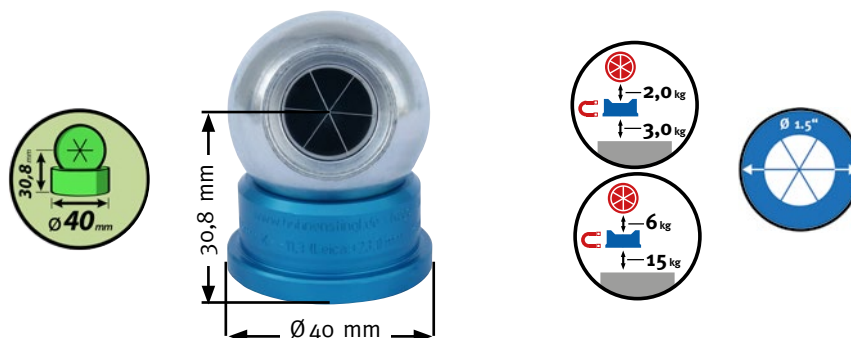
- Turned part made of hard anodised aluminium with integrated permanent magnet
- For mounting on magnetic surfaces, e.g. railway rails, machines, vehicles and centring plates
- Each base is supplied with a protective cover plate

### 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	32,-
	approx. 6,0/15,0 kg	1457.S2	34,-



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	32,-
	approx. 6,0/15,0 kg	1458.S2	34,-



### 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 [page 62](#).

## 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	21,-

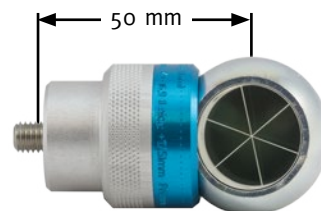
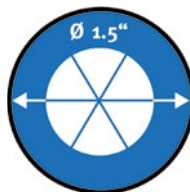




Example: Mounted to a wall bolt

## Magnetic base with thread connections

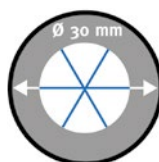
- The distance of the ball center from the base underside to the center of the prism is always exactly  $50 \pm 0,1$  mm (without thread)
- All bases are shipped including cover plate for protection against dirt (s. page 60)
- On request many of the bases are also available with weaker or stronger magnets



### For ball prism $\varnothing 1.5''$ (38,1 mm)



With <b>inner thread</b>				
Description	thread connection	magn. holding force	Order-No.	Euro
Base for ball prism $\varnothing 1.5''$ , inner thread	1/4"	approx. 3 kg	<b>1466.14</b>	46,50
	M8	approx. 3 kg	<b>1466.08</b>	46,50
	5/8"	approx. 3 kg	<b>1466.58</b>	46,50
With <b>outer thread</b>				
Description	thread connection	magn. holding force	Order-No.	Euro
Base for ball prism $\varnothing 1.5''$ , outer thread	1/4" x 8 mm	approx. 3 kg	<b>1466.14a</b>	49,50
	M8 x 8 mm	approx. 1 kg	<b>1466.08aL</b>	40,-
		approx. 3 kg	<b>1466.08a</b>	49,50
	5/8" x 11 mm	approx. 3 kg	<b>1466.58a</b>	49,50

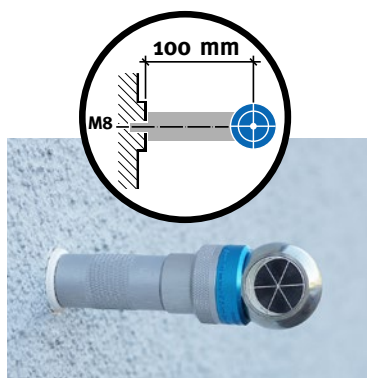


### For ball prism $\varnothing 30$ mm



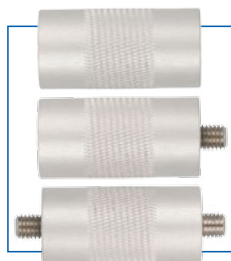
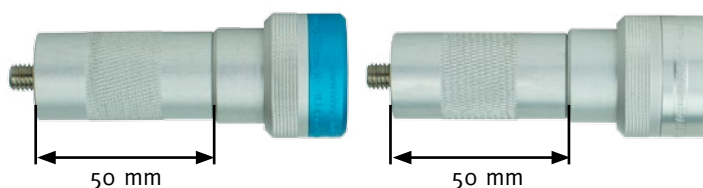
With <b>inner thread</b>				
Description	thread connection	magn. holding force	Order-No.	Euro
Base for ball prism $\varnothing 30$ mm, inner thread	1/4"	approx. 4,5 kg	<b>1465.214</b>	46,50
	M8	approx. 4,5 kg	<b>1465.208</b>	46,50
	5/8"	approx. 4,5 kg	<b>1465.258</b>	46,50
With <b>outer thread</b>				
Description	thread connection	magn. holding force	Order-No.	Euro
Base for ball prism $\varnothing 30$ mm, outer thread	1/4" x 8 mm	approx. 4,5 kg	<b>1465.214a</b>	49,50
	M8 x 8 mm	approx. 0,5 kg	<b>1465.08a</b>	40,-
		approx. 4,5 kg	<b>1465.208a</b>	49,50
	5/8" x 11 mm	approx. 4,5 kg	<b>1465.258a</b>	49,50





### ■ Extension for thread bases - Wall offset 100 mm

With the following adapters, the ball bases with M8 thread (s. page 61) can be extended to the wall offset of 100 mm (AdV version, German norm).



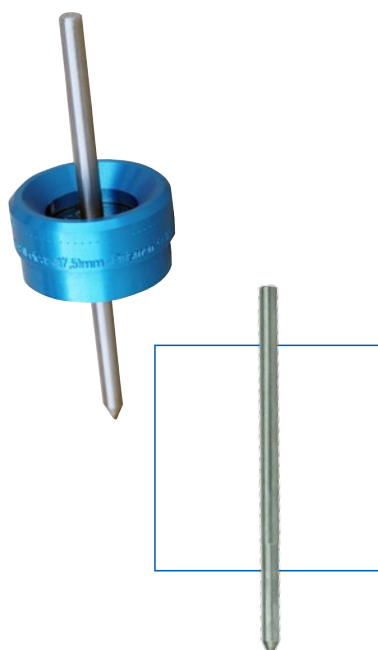
Description	Thread 1st side	Thread 2nd side	Order-No.	Euro
Extension, Aluminium, Ø 25 x 50 mm	M8 inner thread	M8 inner thread	<b>0372.050</b>	22,50
	M8 outer thread	M8 inner thread	<b>0373.050</b>	23,50
	M8 outer thread	M8 outer thread	<b>0374.050</b>	24,50

#### NOTE

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

### ■ Center Pin

A centering pin / punch is available for the bases 1457.S2 and 1458.S2. This allows the base to be placed on a point that is already marked on the object (e.g. cross, grain).



- Stainless steel Ø 5 x 100 mm
- Without hardened tip (non-magnetic) or with hardened tip (magnetic)

Description	Order-No.	Euro
Centering pin Ø 5 x 100 mm, stainless steel	<b>1458.Z</b>	12,-
Centering pin Ø 5 x 100 mm, stainless steel, <b>hardened tip</b>	<b>1458.ZS</b>	18,-

### ■ 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	<b>1460.Z</b>	25,-



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

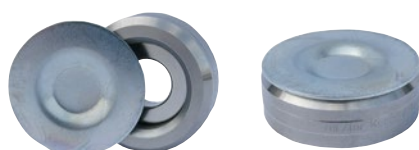
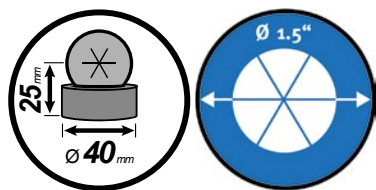
Design and function of the stainless steel ball base corresponds to that of the aluminium ball bases.

### With permanent magnet

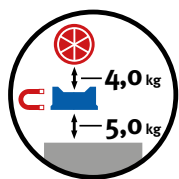
The integrated permanent magnet allows the ball base to be attached to all magnetic surfaces, e.g. railway rails, machines, vehicles and centering plates. [s. page 66.](#)

#### Special features:

- Casing made of stainless steel (V2A)
- Integrated ring magnet with centric bore Ø 14 mm
- Height-Offset HO of prism center to bottom surface of base:  $25 \pm 0,1$  mm
- Bottom surface-diameter of base:  $\varnothing 40 \pm 0,01$  mm
- Fits to centering plate No. 6009 [s. page 66](#)
- 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", <b>with magnet (holding force approx. 4,0/5,0 kg)</b> , with cover plate	<b>1430</b>	58,-

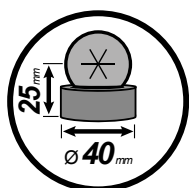


#### PLEASE NOTE

Please also note our special bases made of stainless steel for industrial 3-D measurements [s. page 98](#)

### Without permanent magnet

For applications where no magnet is needed. This base can of course only be used horizontally.

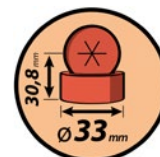
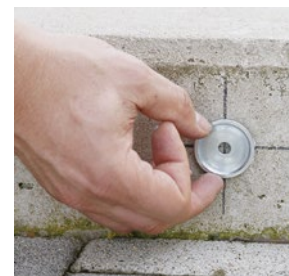
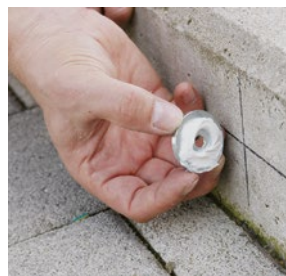


Description	Order-No.	Euro
Stainless steel base Ø 40 mm for ball prism Ø 1.5" (38,1 mm), <b>without magnet</b>	<b>1431</b>	47,-



## 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 67)
- 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	<b>1461</b>	7,50

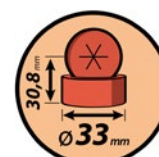


### To use with adhesive and / or to screw on

- 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 67)
- Center bore hole Ø 8 mm for countersunk screws



### ■ Galvanized steel (magnetic) or stainless steel (magnetic)

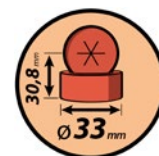
Description	Order-No.	Euro
Centering plate Ø 33 mm, countersunk bore 8 mm, galvanized	<b>1464</b>	10,-
Centering plate Ø 33 mm, countersunk bore 8 mm, stain. steel	<b>1464.VA</b>	13,-

#### TIP

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



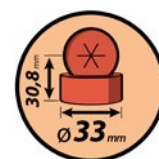
## To screw on and / or nail to object



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



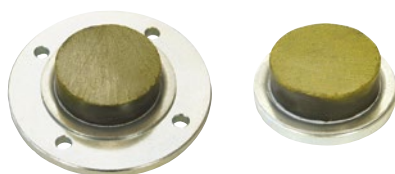
Description	Order-No.	Euro
Centering plate $\varnothing 33$ mm to screw on object, center bore hole $\varnothing 8$ mm + 4 x $\varnothing 4,5$ mm eccentric bore hole	<b>1463</b>	9,-



## Cover plate for centering plates $\varnothing 33$ 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 $\varnothing 33$ mm, with magnet	<b>1453.50</b>	3,50







Universal centering plate for base Ø 40 mm

To use with adhesive and / or to screw on

- Steel plate Ø 50 x 7 mm, galvanized
- Accuracy of centering fit: Ø40 ± 0,1 mm



■ Mounting options

- To use with assembly adhesive [s. page 67](#)
- Center borehole Ø 8 mm for a countersunk screw
- Eccentric holes Ø 5 mm for 2 to 4 countersunk screws



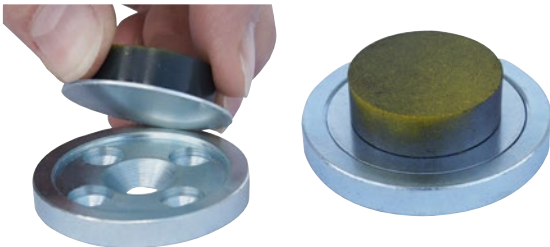
Description	Order-No.	Euro
Centering plate for base Ø 40 mm, to use with adhesive or to screw onto object	6009	11,-

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	3,50



## 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	<b>1462</b>	12,50





## 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 magnets

- 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	<b>1468.15</b>	40,-

### INFO

If you purchase 10 ball prisms at the same time, you will receive transport case no. 1468.15 free of charge (only end customers, not resellers).



## 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	<b>1468.6</b>	40,-

## 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	<b>1469</b>	8,50

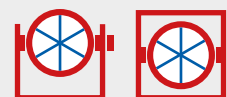






## Monitoring Prism Series MoniPro

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



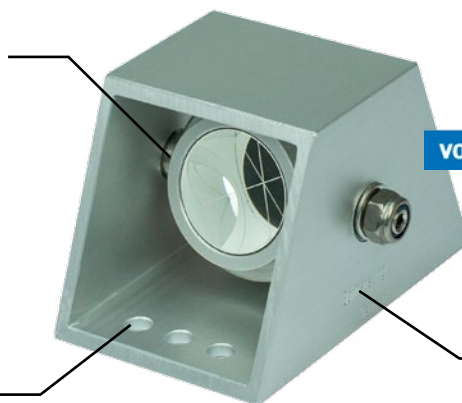
## Prism in protective frame

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

Frame made of anodised aluminium as protection against damage/weather

6 boreholes Ø 5 mm on underside



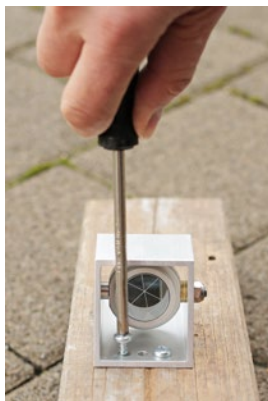
VOLLMETALL

Dimensions:  
L80 x B50 x H50 mm

Description	Order-No.	Euro
Prism in protective frame, Series MoniPro	<b>1202</b>	145,-

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

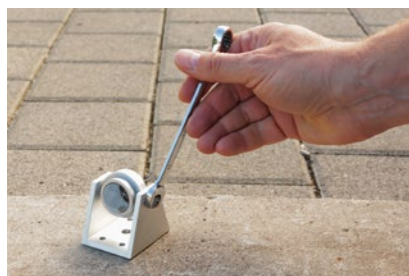
### ■ To screw onto object



### ■ Non-destructive fixing: Assembly adhesive

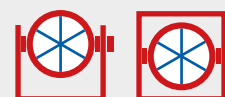






## Monitoring Prism Series **MoniPro**

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

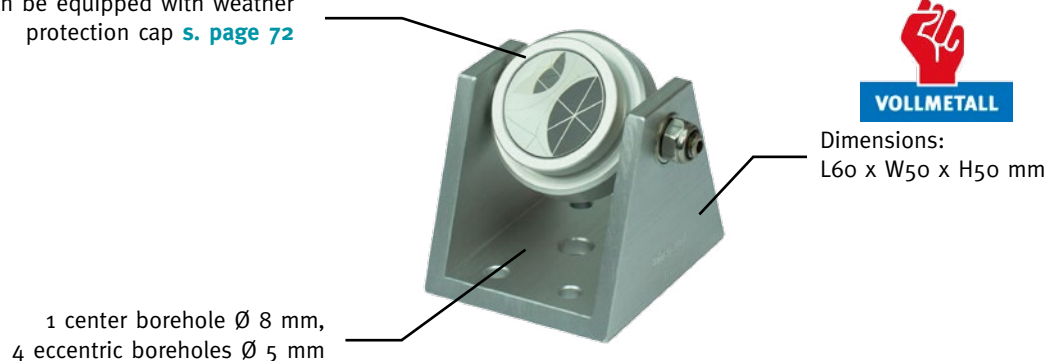


## Prism in U-Frame

Ideal for monitoring from one or more tachymeter positions

- Prism  $\varnothing$  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 (see picture)
- Conical frame made of anodised aluminium
- Weight: 150 g

Can be equipped with weather protection cap [s. page 72](#)



Description	Order-No.	Euro
Prism in U-Frame, MoniPro Series	<b>1204</b>	145,-

## 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  $\varnothing$  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  $\pm 0.2$  mm is given when removing and reattaching the support or when changing the orientation of the prism towards different tachymeter positions.



### Fastening platform for prism in U-Frame

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

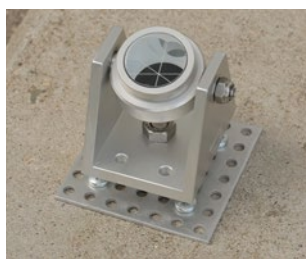
- Platform made of perforated sheet metal, hole Ø 5 mm, hole spacing 10 mm
- Cylindrical support Ø 30 x 13 mm with stainless steel thread M8 x 12 mm
- Dimensions perforated plate: L70 x W70 x H2 mm
- Is shipped with stainless steel hexagon nut (SW 13 mm)
- Weight: 60 g



Description	Order-No.	Euro
M8 mounting platform for prism in U-Frame	1210.7070	14,-

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



VOLLMETALL



Description	Ø	Order-No.	Euro
Magnetic base with M8 outer thread, incl. V2A hexagon nut	Ø 33 mm	<b>1206.33</b>	28,-
	Ø 40 mm	<b>1206.40</b>	28,-

Our centering plates are particularly suitable for monitoring tasks with precise repeat measurements ([s. page 64](#))



## 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



VOLLMETALL



Description	Order-No.	Euro
Weather protection cap for prism in U-Frame Series MoniPro	<b>1201</b>	12,-

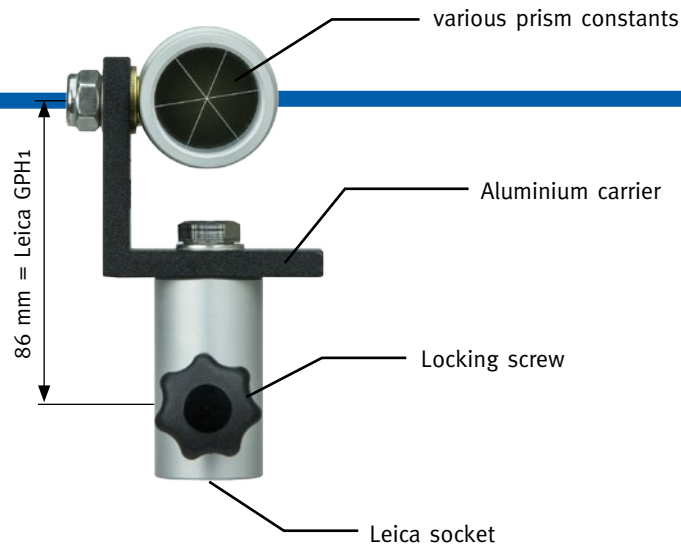
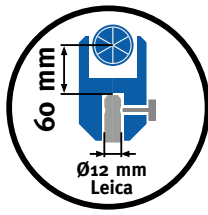
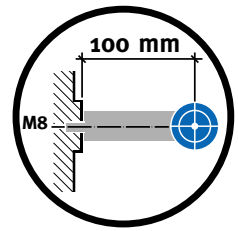




## L-Bar-Prism with Leica socket

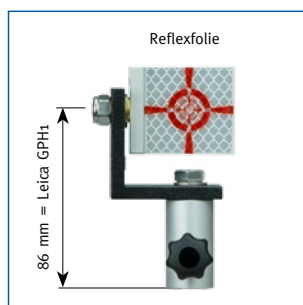
To mount Leica spigots Ø12 mm

- 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	<b>-11,3</b> (Leica = +23,1) mm	<b>1002.11</b>	112,-
	Ø 25 mm	<b>-16,9</b> (Leica = +17,5) mm	<b>1002.17</b>	112,-
		<b>-30</b> (Leica = +4,4) mm	<b>1002.30</b>	162,-
		<b>-34,40</b> (Leica = 0) mm	<b>1002.34</b>	162,-
		<b>-35</b> (Leica = 0,6) mm	<b>1002.35</b>	162,-



### With reflective foil

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

#### INFO

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

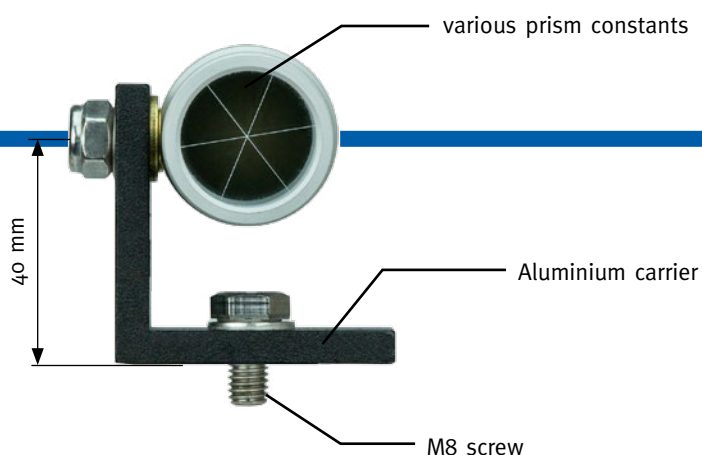




## L-Bar-Prism with M8 screw

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 resistance
- Durable, robust fastening to the structure by large-scale fastening screw and manufacturing of the carrier in solid metal
- Offset distance 40 mm from target center to wall bolt
- Comes with M8 stainless steel screw and washer



### 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	<b>-11,3</b> (Leica = +23,1) mm	<b>1005.11</b>	118,-
	Ø 25 mm	<b>-16,9</b> (Leica = +17,5) mm	<b>1005.17</b>	108,-
		<b>-30,0</b> (Leica = +4,4) mm	<b>1005.30</b>	158,-
		<b>-34,4</b> (Leica = 0) mm	<b>1005.34</b>	158,-
		<b>-35,0</b> (Leica = -0,6) mm	<b>1005.35</b>	158,-



### 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	<b>1025.0</b>	38,-

#### INFO

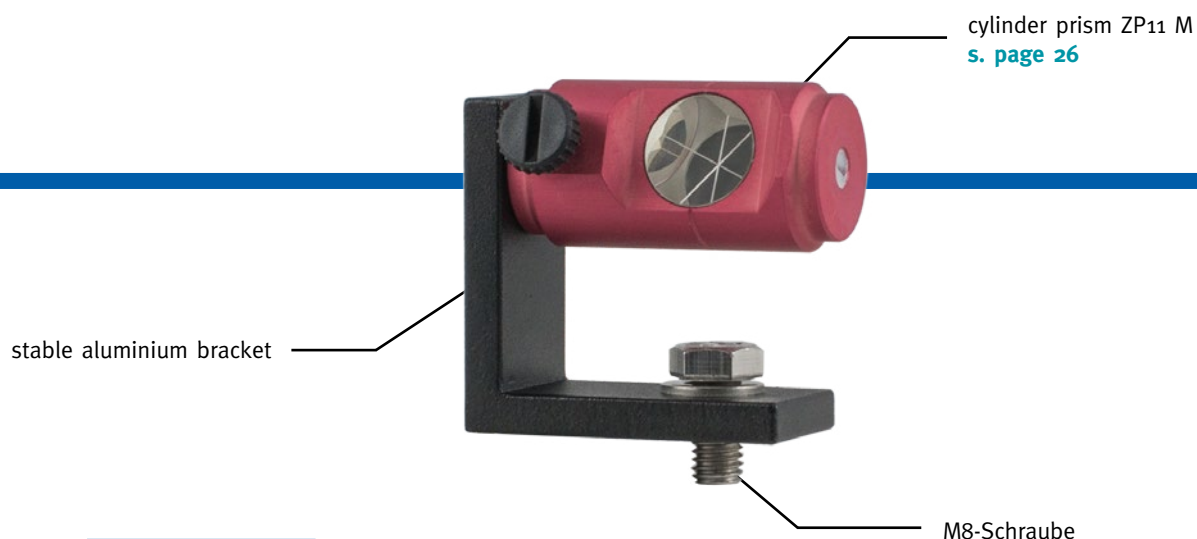
With all prism constants, the tilting and standing axis runs exactly through the visible prism centre / target foil (central symmetrical point).



## L-Carrier for Cylinder Prism ZP11

Fastening with M8 screw or with wood/plug screws

- Can be aligned in any direction due to cardanic mounting option
- With stainless steel bolt B1216 for quick mounting and removal (see pictures) of cylinder prism ZP11, without loss of accuracy
- Comes with M8 hexagon head screw (SW13) and stainless steel washer
- Various mounting options:
  - with M8 screw on bolts with M8 inner thread
  - non-destructive with mounting adhesive [s. page 67](#)
  - 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	<b>6680</b>	32,-

### TIP

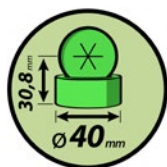
The B1216 quick connection offers numerous advantages: With the ZP11 removed, all screws are freely accessible when attaching the L-Carrier. The ZP11 can be removed during the measurement-free time for protection against destruction and theft at object points frequented by the public.



## 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  $\pm$  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 ( $\varnothing 33/40$  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 $\varnothing 33$ mm	reflective foil target (26x40 mm)	0 (Leica = +34,4) mm	1060.0	60,-
	glass prism $\varnothing 17,5$ mm	-11,3 (Leica = +23,1) mm	1060.11	140,-
	glass prism $\varnothing 25$ mm	-16,9 (Leica = +17,5) mm	1060.17	130,-
		-30 (Leica = +4,4) mm	1060.30	180,-
		-34,40 (Leica = 0) mm	1060.34	180,-
		-35 (Leica = -0,6) mm	1060.35	180,-

Centering plates [s. page 64](#)

Description	foil / prism	prism constant K	Order-No.	Euro
Reflector on L-Carrier with cylindrical base with magnet $\varnothing 40$ mm	reflective foil target (26x40 mm)	0 (Leica = +34,4) mm	1070.0	60,-
	glass prism $\varnothing 17,5$ mm	-11,3 (Leica = +23,1) mm	1070.11	140,-
	glass prism $\varnothing 25$ mm	-16,9 (Leica = +17,5) mm	1070.17	130,-
		-30 (Leica = +4,4) mm	1070.30	180,-
		-34,40 (Leica = 0) mm	1070.34	180,-
		-35 (Leica = -0,6) mm	1070.35	180,-

Centering plates [s. page 66](#)

### INFO

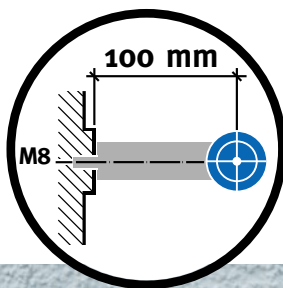
For all constants the tilting and standing axis runs exactly through the target center: at K = 0 through the center of the printed target sign, with all other constants through the visible prism center (central symmetric point). This minimizes errors if the prism is inaccurately aligned with the total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



### ■ Centering plates

[s. page 64](#)





## 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. [s. page 80.](#)

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 [s. page 78.](#)

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 55](#)) and on the other on our **cylinder prism ZP11** ([s. page 26](#)).

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 78](#))

### 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 <b>Ø33 mm</b> and 2 ball prisms Ø30 mm or Ø1.5“	<b>6710.M33</b>	120,-

Including 2 built-in centring plates M8 No. 6150.40

Description	Order-No.	Euro
Twin-Holder with M8 thread, for 2 thread bases <b>Ø40 mm</b> and 2 ball prisms Ø30 mm or Ø1.5“	<b>6710.M40</b>	124,-

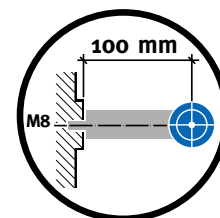






## Holder with Leica socket

- 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 $\varnothing 33$ mm and 2 ball prisms $\varnothing 30$ mm or $\varnothing 1.5$ "	6705.M33	120,-

Including 2 built-in centring plates M8 No. 6150.40

Description	Order-No.	Euro
Twin-Halter mit Leica-Bolzenaufnahme, for 2 thread bases $\varnothing 40$ mm and 2 ball prisms $\varnothing 30$ mm or $\varnothing 1.5$ "	6705.M40	124,-

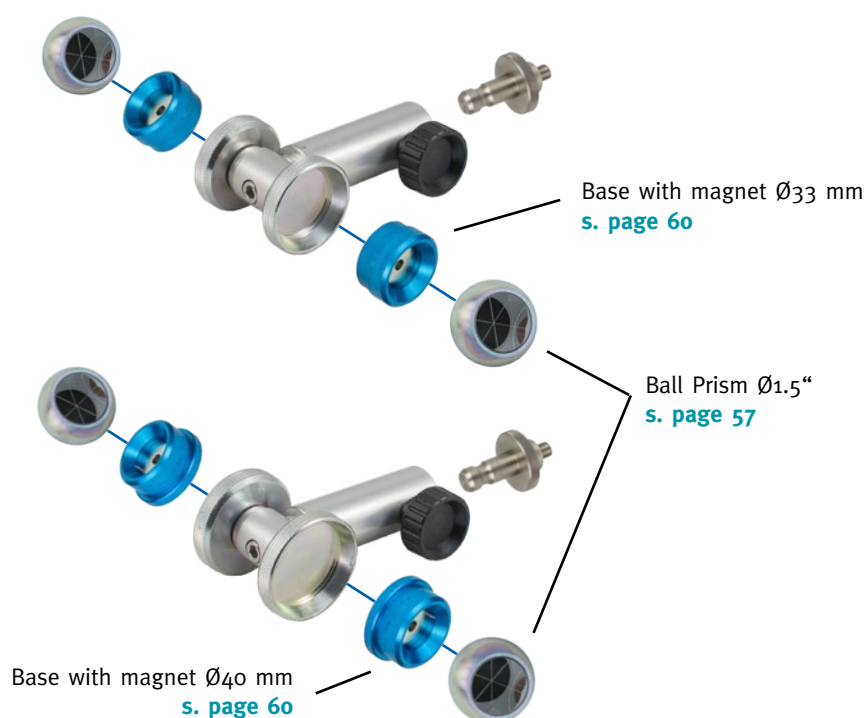
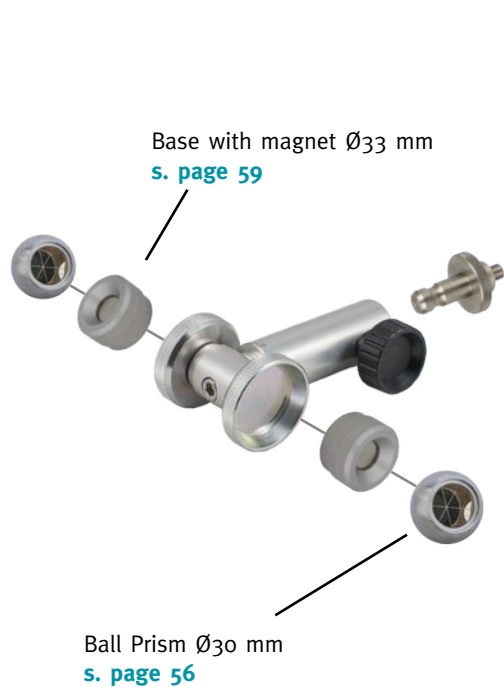


### TIP

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



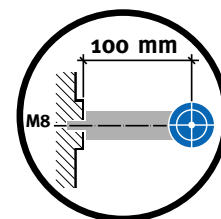
Leica Wall Adapter WA  
s. page 41





## 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, [page 77](#))

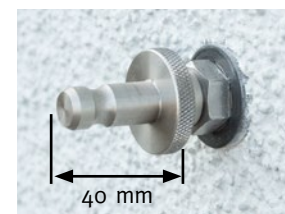
Description	Order-No.	Euro
Twin-Holder with M8 thread, for 2 cylinder prisms ZP11	<b>6720</b>	120,-



### 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	<b>6715</b>	120,-



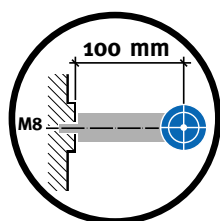
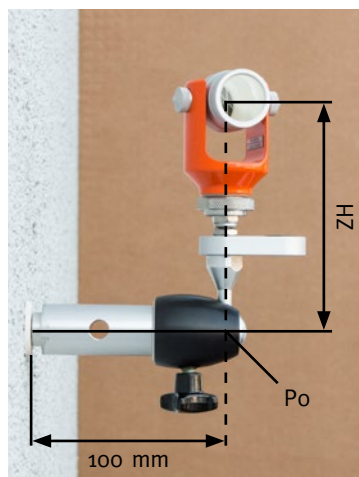
## Accessories

Leica Wall Adapter WA [s. page 41](#)



Cylinder Prism ZP11 [s. page 26](#)





## Prism holder with ball head for M8 wall bolts

Use of any prisms perpendicular to the nominal point  $P_o$ , 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 [s. page 10](#).

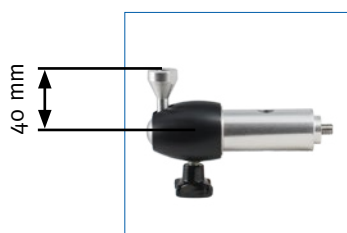
This is not possible with many other prisms and targets due to their design or size. With the help of our prism holder with ball joint they can still be used. After screwing into the M8 wall bolt, the prism centre can be positioned vertically above the target point using a circular bubble. The corresponding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

- The centre of the ball joint is located at the nominal point  $P_o$
- 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:

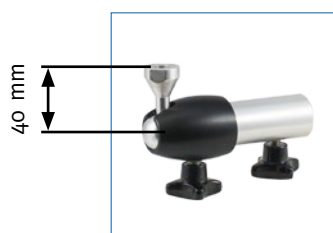
### To screw directly into the wall bolt



- M8 outer thread made of stainless steel for screwing into the bolt
- Lateral bore  $\varnothing 10$  mm to help screwing in the holder
- Distance 40 mm from ball head center  $P_o$  to screw-in surface of **M8 internal thread**

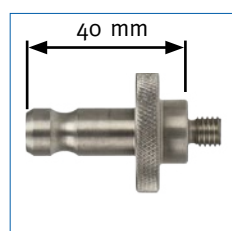
Description	Order-No.	Euro
Ball head for M8 wall bolt, M8 outer thread	<b>6676.M</b>	80,-

### For mounting on a Leica spigot with $\varnothing 12$ mm and 40 mm effective length



- Leica bolt socket  $\varnothing 12 \times 26$  mm
- Large star grip screw for fixation on the Leica bolt
- Distance 40 mm from ball center  $P_o$  to screw-in surface of **M8 internal thread**

Description	Order-No.	Euro
Ball head for Leica spigot, with Leica socket	<b>6676.L</b>	80,-



## Adapter WA Leica

- [s. page 41](#)

Description	Order-No.	Euro
Adapter WA Leica, M8 – Leica $\varnothing 12 \times 27$ mm	<b>0830</b>	17,-







## 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 61](#) 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

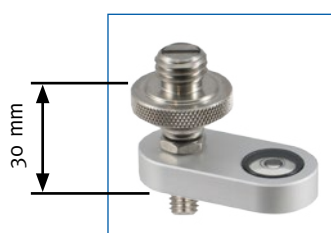
Description	Order-No.	Euro
See-through circular level (glass) <b>for thread base</b> , accuracy 30'	<b>1466.B</b>	36,-



## 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



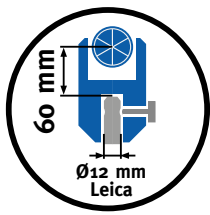
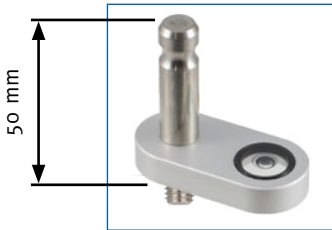
Description	Order-No.	Euro
Adapter M8 outer thread - 5/8" outer thread, circular level 30'	<b>6677.58</b>	48,-





■ 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	34,-



■ 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	40,-





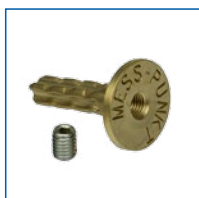
## M8 Wall Bolt as measuring point

### 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	<b>0891</b>	2,05



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	<b>0893</b>	1,05
Dowel wall bolt, white, length 40 mm	<b>0895</b>	1,10
Dowel wall bolt, brown, length 40 mm	<b>0897</b>	1,20



### 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	<b>0890</b>	55,-



## Precision wall bolts with M8 internal thread

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



### ■ Bolt for mounting by mortar

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

Description	Order-No.	Euro
Wall bolt $\varnothing 12 \times 50$ , M8 inner thread, hexagon head, stain. steel	<b>o892.50</b>	5,20
Wall bolt $\varnothing 12 \times 60$ , M8 inner thread, hexagon head, stain. steel	<b>o892.60</b>	5,30

### ■ Screw for mounting with dowel

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

Description	Order-No.	Euro
Wall screw $\varnothing 12 \times 70$ , M8 inner thread, hexagon head, stain. steel	<b>o898</b>	5,50

### NOTE

The wall screw with dowel is not recommended for masonry made of brick or hollow block bricks etc.!



### ■ Accessories

Description	Order-No.	Euro
Dowel $\varnothing 14 \times 75$ , for screw- $\varnothing$ 10-12 mm	<b>o898.D</b>	0,80
Allen key SW 5, straight, with plastic handle	<b>o899.5</b>	4,50
Masonry drill SDS-Plus $\varnothing 14 \times 160/100$ mm	<b>o898.B</b>	10,-

## Magnetic Quick Change System for M8 Wall Bolts



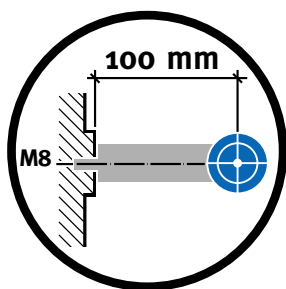
- Exchange of different targets/prisms within seconds
- Full metal materials: Anodized aluminium, galvanized steel, stainless steel V2A
- Robust and weatherproof
- High-precision forced centring

### ■ 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.

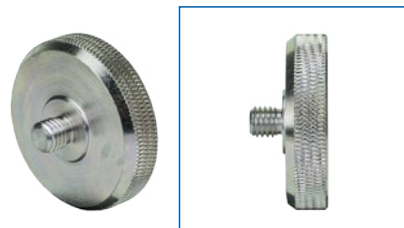
The targets stick securely and force-centered in the centering plate with an accuracy of  $\pm 0.1$  mm.



- 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

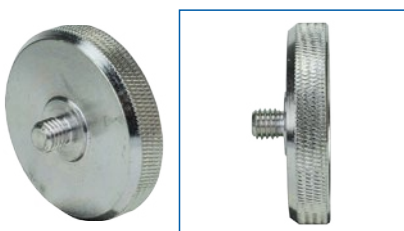
- Centering Ø 33 mm to mount bases with integrated magnets
- Outer-Ø 43 mm



Description	Order-No.	Euro
M8 centering plate Ø 33 mm, effective length 3 mm	<b>6150.33</b>	22,-

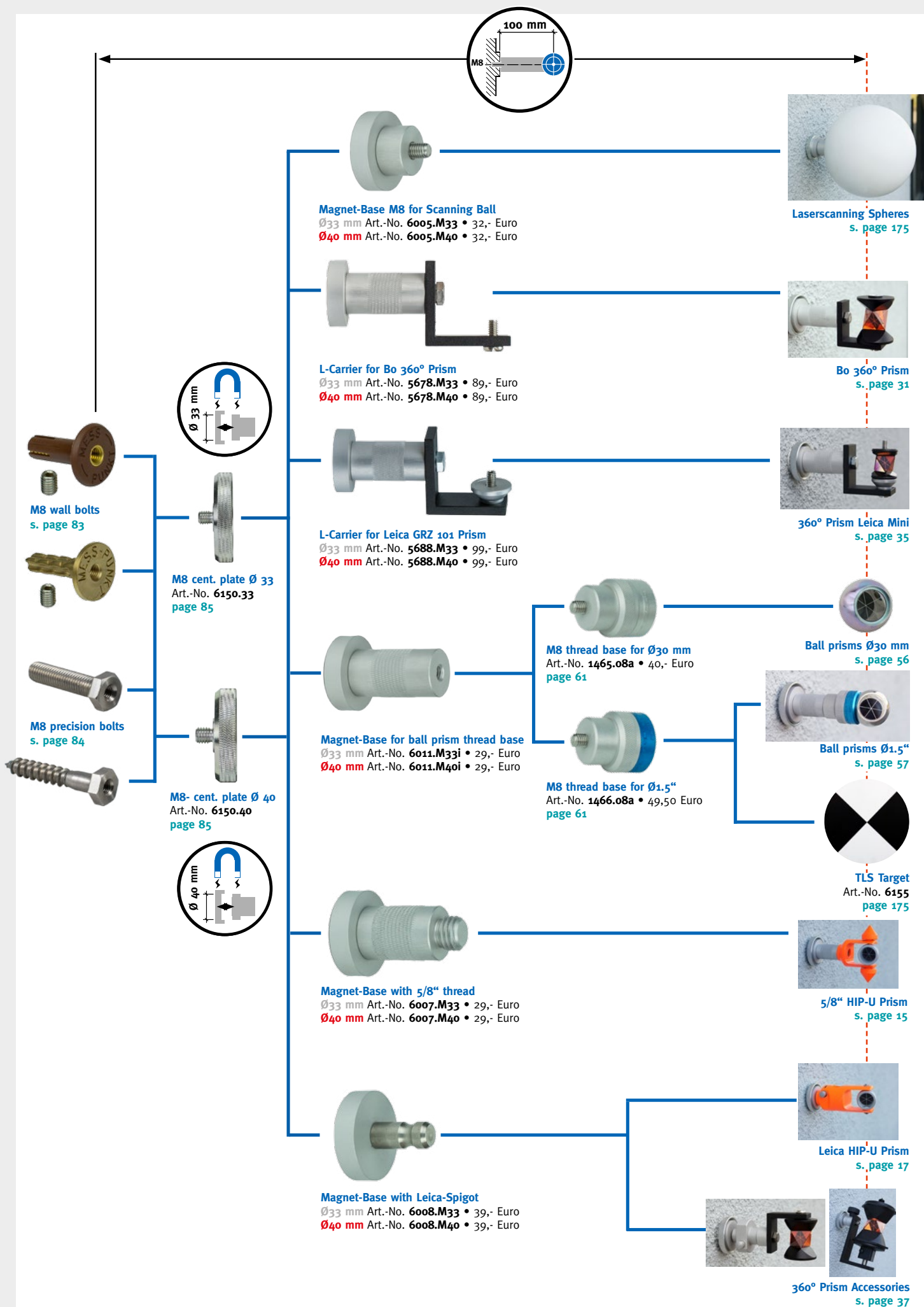
### M8 centering plate Ø 40 mm

- 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	<b>6150.40</b>	23,-





# Precision Measurements

## ■ Page 1 of 1

### C.1 Mini-Vektor „modular“ with ZP11 prisms page 88



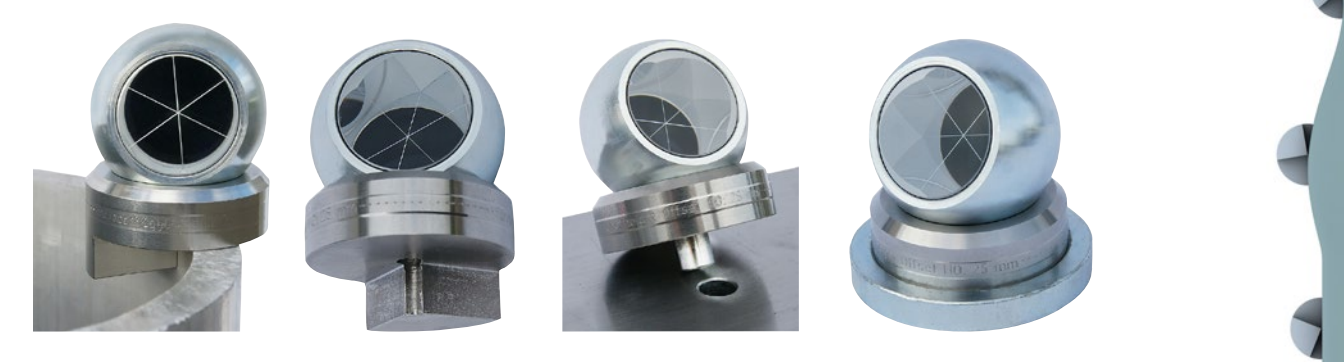
### C.2 Mini-Vektor „rigid“ (one unit) page 93



### C.3 Ground Tripod „Triangle“ for precise point measurements page 95



### C.4 Ball prism bases for industrial 3D-Measurements page 98



### C.5 Triangle frame „Klimax“ for ground and wall points page 102





## Modular Mini-Vektor with ZP11 Cylinder Prisms

### INFO

See also our „rigid“ mini vector with 2 prisms and fixed prism spacing of 100 mm. [s. page 93](#)

The newly developed ZP11 cylinder prism ([s. page 26](#)) forms the basis for the construction of a modular mini vector. By assembling several ZP11s with various extensions and a centring tip, individual prism poles with a wide range of applications can be mounted to a unit. The B1216 connection system, which is also new, ensures fast and precise connection of the individual components.

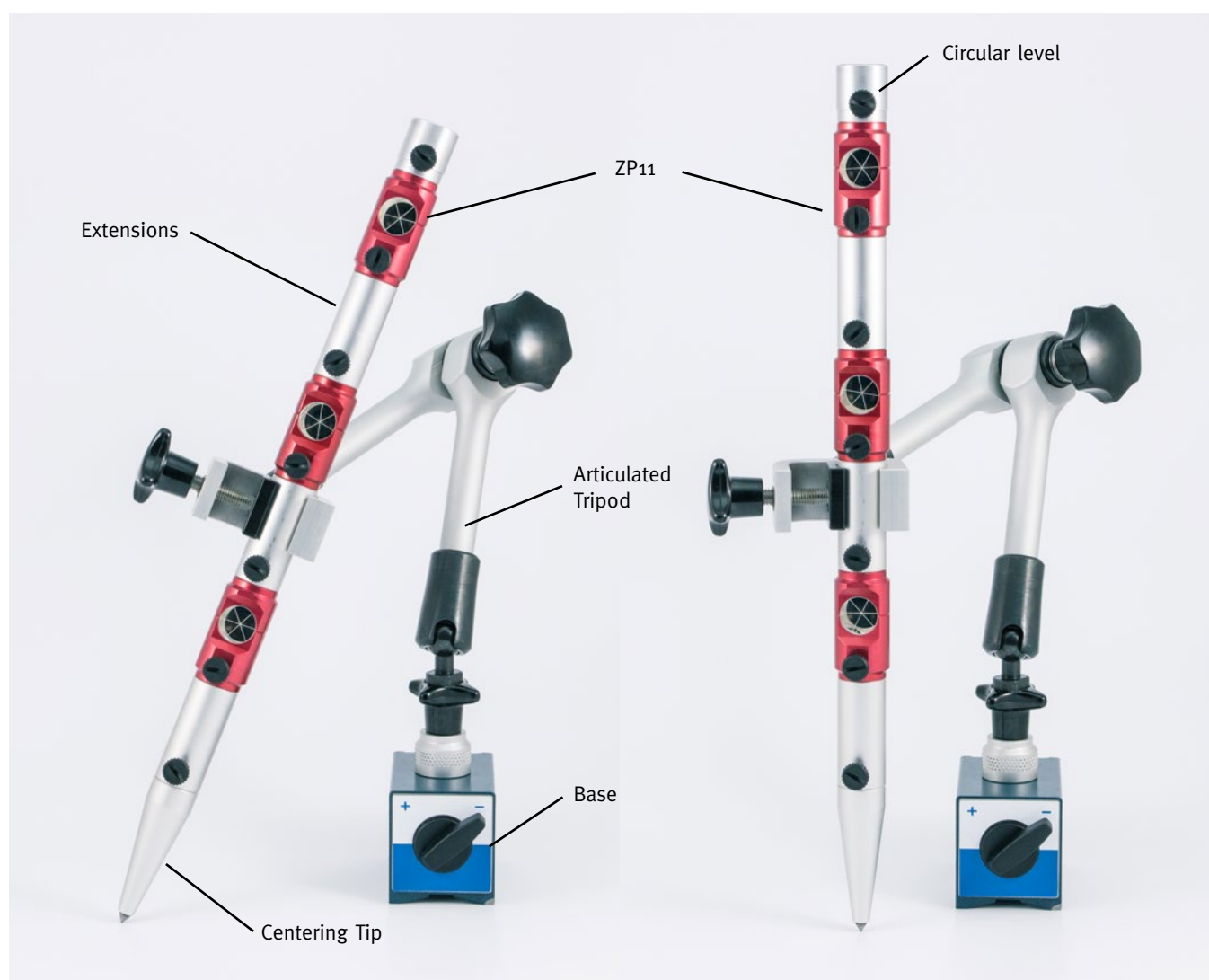


Table of  
contents



Print  
page

previous  
page



next  
page

step  
back



step  
forward

## Extensions / spacers

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



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

Description	prism distance	Order-No.	Euro
Extension 50 mm with bolt + socket	<b>100 mm</b>	<b>6650</b>	37,-
Extension 100 mm with bolt + socket	<b>150 mm</b>	<b>6651</b>	41,-
Extension 150 mm with bolt + socket	<b>200 mm</b>	<b>6653</b>	45,-



## Centering tip for Mini-Vektor

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

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

**For distance from tip to centre of prism 50 mm:**

Description	Order-No.	Euro
Centering tip, length 20 mm, hardened mandrel, B1216 bolt	<b>6804</b>	28,-



**For distance from tip to centre of prism 100 mm:**

Description	Order-No.	Euro
Centering tip, length 70 mm, hardened mandrel, B1216 bolt	<b>6665</b>	41,-



## 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	<b>6670</b>	26,-
Circular level for modul. Mini-Vektor, B1216 socket	<b>6671</b>	29,-



Table of  
contents



Print  
page

previous  
page



next  
page

step  
back



step  
forward



## 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 (see below).

- 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	<b>5920</b>	175,-

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



Description	Order-No.	Euro
Articulated tripod with M8 outer thread, <b>heavy design</b>	<b>5921</b>	250,-

### TIP

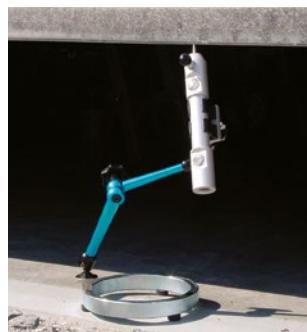
For vector lengths starting from 300 mm we recommend the heavy design of the articulated tripod.

## 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	<b>5932</b>	35,-



## 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	<b>5930</b>	35,-



- 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, <b>heavy design</b>	<b>5931</b>	70,-



## 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



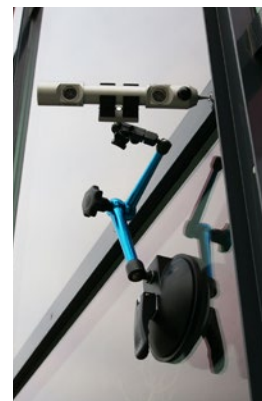
Description	Order-No.	Euro
Clamp M8 for articulated tripod	<b>5934</b>	60,-



## 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.	<b>5936</b>	46,-



## 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	<b>5938</b>	76,-


[Table of contents](#)

[Print page](#)
[previous page](#)

[next page](#)
[step back](#)

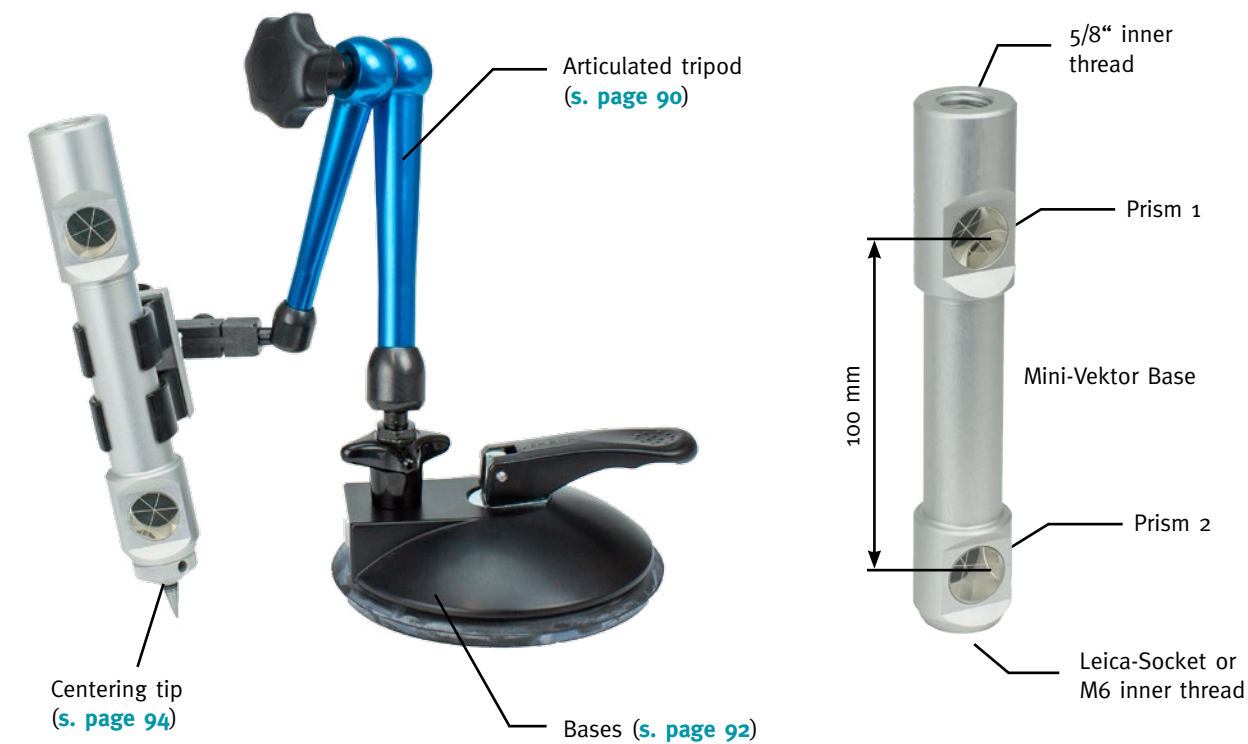
[step forward](#)

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.



Mini-Vektor, Base

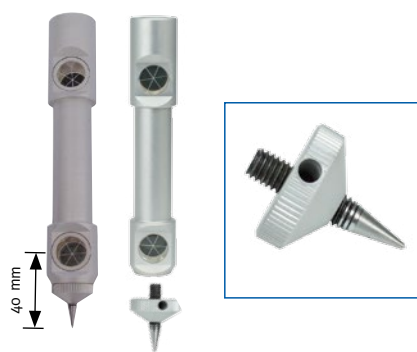
The Mini-Vektor is available in 2 versions, which differ only in the type of connection for the extensions/tips: M6 female thread or Leica bolt socket.

- 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	270,-
Mini-Vektor, Base, Leica bolt socket Ø 12 mm	5910	290,-



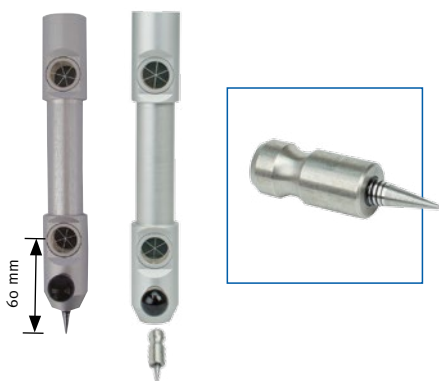


## Extensions with hardend centering tip

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  $V = 40$  mm. Larger extensions are available on request.

Description	Order-No.	Euro
M6 extension, $V = 40$ mm	<b>5901</b>	28,50



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  $V = 60$  mm.

Longer extensions: [s. page 44](#)

Description	Order-No.	Euro
Leica extension, $V = 60$ mm	<b>5911</b>	28,50

## 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'	<b>1585.30</b>	25,50

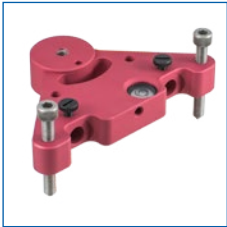
Includes 2.5 mm Allen key.

Description	Order-No.	Euro
Adjustable circular level „central“, glass bubble, accuracy 30'	<b>1587.30</b>	40,50

[see also page 39](#)



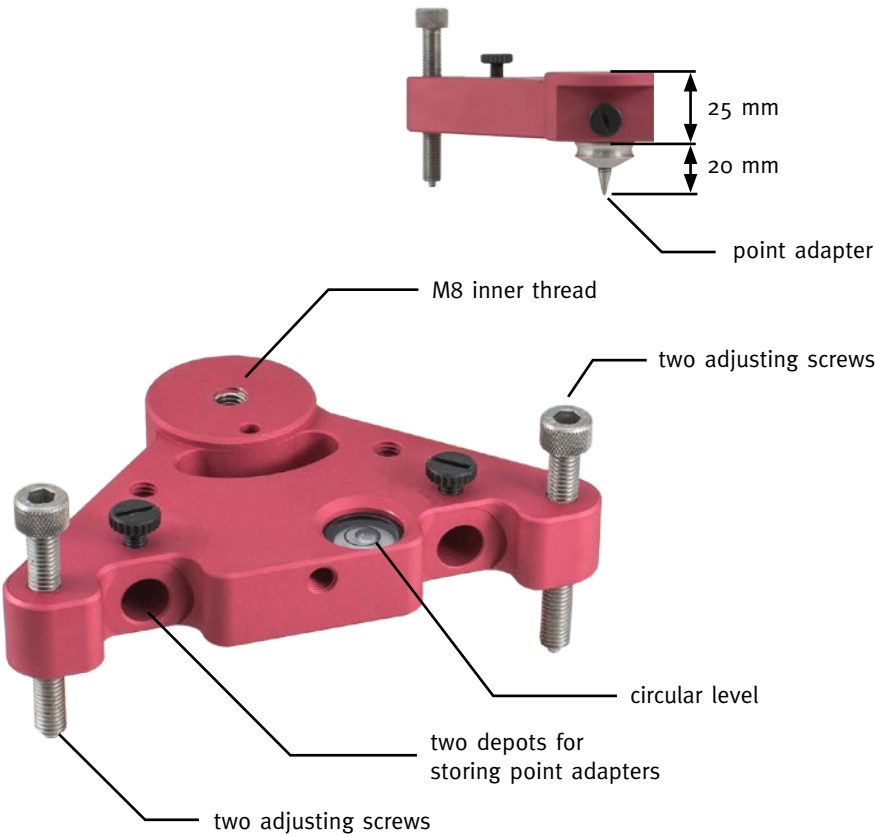
[s. page 90](#)



## 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	260,-



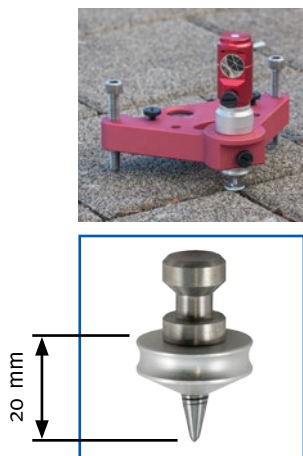
## Point adapters

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	<b>6804</b>	28,-

### ■ 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

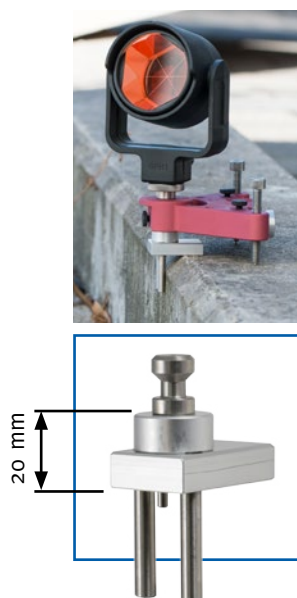


Description	Order-No.	Euro
Cone for ground tripod, B1216 bolt	<b>6806</b>	28,-

### ■ 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	<b>6808</b>	42,-

### ■ Transport case

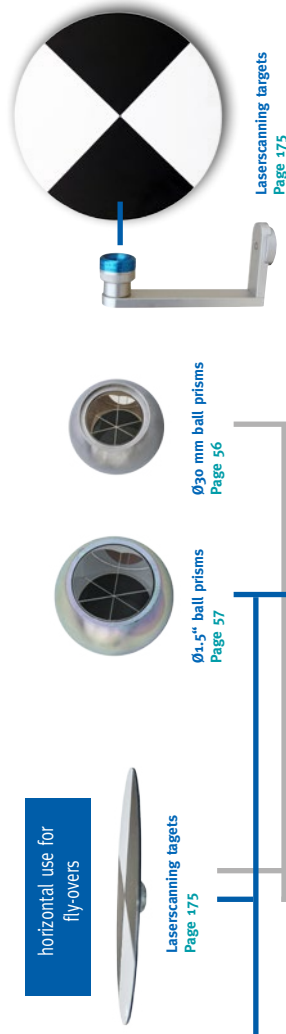
For storage and transport of 1x ground stand and prism or 2x ground stands

- 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“	<b>1468.1</b>	28,-

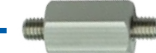




other prisms with  
Leica connection

Leica HIP prisms  
Page 17Cylinder prism ZP11  
Page 26

Adapter M8 to Leica spigot  
Art.-No. 0830 • 17,- €  
Page 41



**Adapter M8 to M8**  
Art.-No. 6005 • 15,- €  
**Page 176**



M8 thread base for  
Ø1.5" ball prisms  
Page 61



**M8 thread base for  
Ø30 mm ball prisms**  
**Page 61**



Magnetic bases for  
Ø30 mm ball prism  
Page 59



55

Centering plates  
Page 64

series



Page 85



Community



**Ground Tripod**  
Art.-No. 6800 • 260,- €  
**Page 95**



Angular Stop  
Art.-No. 6808 • 42,- €  
Page 96

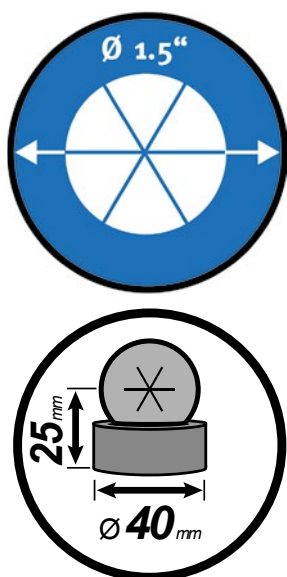


**Point Adapter „cone“**  
Art.-No. 6806 • 28,- €  
**Page 96**



Centering tip  
Art.-No. 6804 • 28,- €  
Page 96





## 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 55](#).

### 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 57](#)
- Positional accuracy of the ball in the base:  $\pm 0,02$  mm
- Height-Offset HO of prism center:  $25 \pm 0,1$  mm
- The small distance to the object allows very accurate measurements
- Ring marking with engraved ball diameter 1.5" (38,1 mm) and Height-Offset HO 25 mm

#### ■ Varying magnetic strengths

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

##### Weaker magnet:

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

##### Stronger magnet:

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



Table of contents



Print page

previous

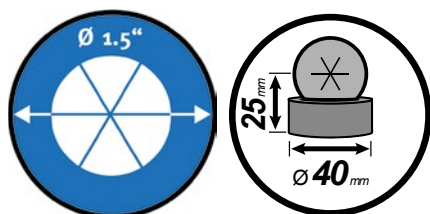


next

step back



step forward



## Base for measurement of corners & edges

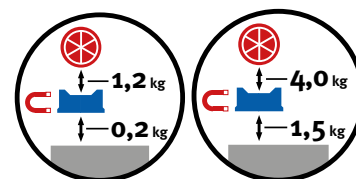
The base is placed on the corner/edge and the ball prism is aligned with the tachymeter for measurement. With magnetic surfaces, the integrated permanent magnet ensures that the base sticks automatically to the measuring object and does not have to be held by hand during the measurement. For measurements 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 <b>for outer corners</b> for ball with Ø 1.5", stainless steel	around 1,2 / 0,4 kg	<b>1434.A</b>	126,-
	around 4,0 / 2,6 kg	<b>1434.AS</b>	131,-

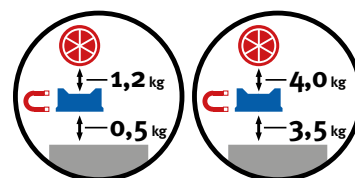


### ■ Inner corners [2]

- Lower part 90°



Description	magnet. holding force	Order-No.	Euro
Ball prism base <b>for inner corners</b> for ball with Ø 1.5", stainless steel	around 1,2 / 0,5 kg	<b>1434</b>	126,-
	around 4,0 / 3,5 kg	<b>1434.S</b>	131,-

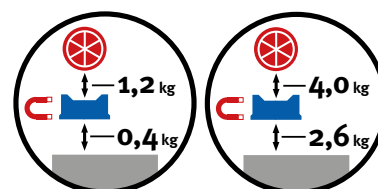


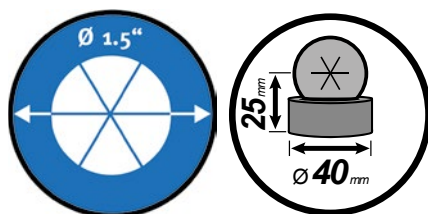
### ■ Kanten [3]

- Lower part exactly semi-circular



Description	magnet. holding force	Order-No.	Euro
Ball prism base <b>for edges</b> for balls with Ø 1.5", stainless steel	around 1,2 / 0,4 kg	<b>1432</b>	126,-
	around 4,0 / 2,6 kg	<b>1432.S</b>	131,-





## Base to measure bore holes

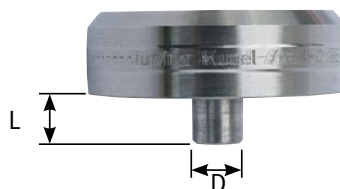
With this base the 3D coordinates of already existing bore holes of tools, fixtures etc. can be determined. For this purpose, the base is equipped with a concentric stud. The bolt diameters are manufactured with „h6 accuracy“. The ball centre is located exactly in the stud axis (=bore axis).

### ■ Features

- General information: [s. page 98](#)
- Bottom part with cylindrical studs with various diameters in h6 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 <b>bore holes</b>	Ø 6 x 8 mm	around 2 kg	<b>1433.06</b>	126,-
	Ø 8 x 10 mm		<b>1433.08</b>	126,-
	Ø 10 x 12 mm		<b>1433.10</b>	126,-
	Ø 12 x 14 mm		<b>1433.12</b>	126,-



## Base with M8 outer thread

For screwing into M8 inner threads e.g. wall bolt [s. page 83](#).

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

### ■ Features

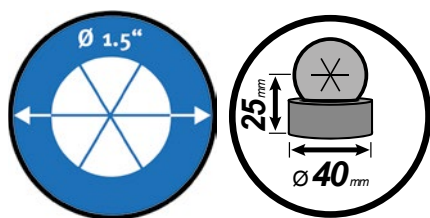
- General information: [s. page 98](#)
- Lower part with M8 outer thread, Länge 8 mm
- Holding force of the magnet: around 2 kg



Description	Order-No.	Euro
Stainless steel base for ball-Ø 1.5" (38,1 mm), with outer thread M8 x 8 mm, with magnet	<b>1433.M8</b>	126,-

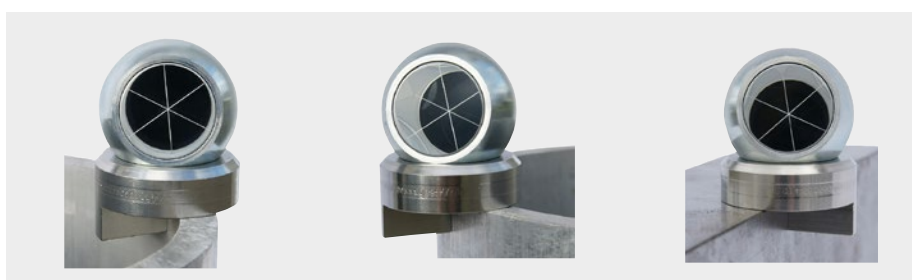
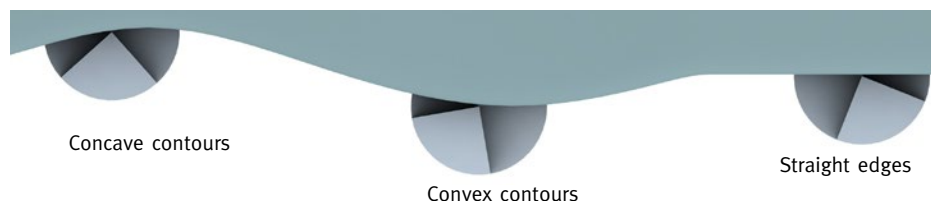
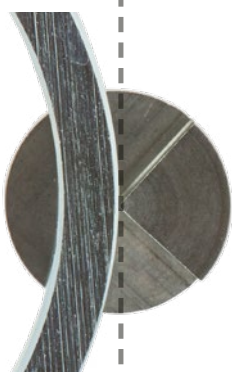
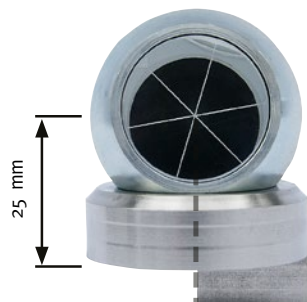


## Basis for measuring contours



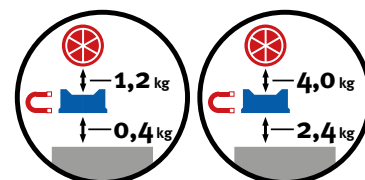
The base is placed onto the object and held with the tip (= base center) against the contour edge. After aligning the ball prism with the tachymeter, the measurement can take place. Due to the permanent magnet built into the base, the ball prism sticks reliably to the base. With the „Contour“ base, both 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 98](#)
- Cylindrical lower part designed as quadrant
- The tip of the quadrant lies exactly in the center of the base
- Positional accuracy of the quadrant tip to the center axis base / prism:  $\pm 0,02 \text{ mm}$



Description	magnet. holding force	Order-No.	Euro
Stainless steel base „contour“, for ball-Ø 1.5“, with magnet	around 1,2 / 0,4 kg	<b>1434.K</b>	145,-
	around 4,0 / 2,4 kg	<b>1434.KS</b>	150,-

### TIP

To „follow“ a contour in tracking mode, we recommend using the base with the weaker magnet (No. 1434.K).



Table of contents



Print page

previous



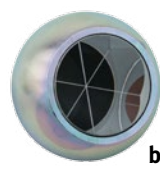
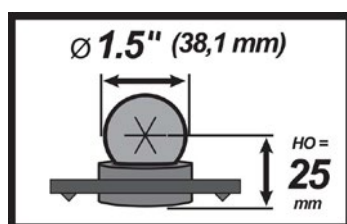
next page

step back



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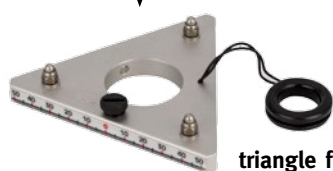




ball prisms Ø 1.5"  
from page 57



bases  
from page 104



triangle frame  
from page 103

## 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
- 3 rubber feet to prevent unintentional slipping of the frame
- Centric bore to put in the stainless steel base
- Screw to secure the inserted base against falling out
- Lateral scale strip (2 x 50 mm) as a help for quick displacement of the target distance while staking out a point

### 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 only 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.



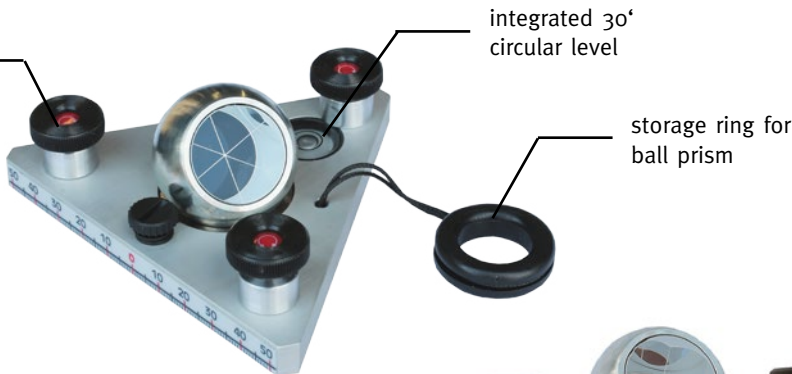
Description	Order-No.	Euro
Triangle frame Klimax (without base / ball prism)	1492	190,-

### 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.

3 height adjustable knurled screws with rubber feet



Description	Order-No.	Euro
Triangle frame KlimaxPlus (without base / ball prism)	1493	240,-



## 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.



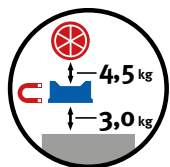
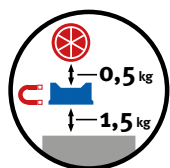
### ■ Base A

Description	Order-No.	Euro
Base A for staking out and measuring points	<b>1495</b>	89,-

### ■ Base A with magnet

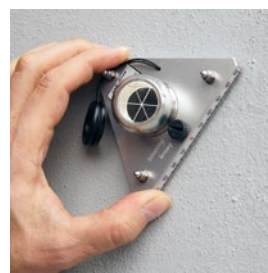
The integrated permanent magnet holds the ball securely in the base. This means that the triangular frame can also be used on walls.

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	<b>1495.M</b>	99,-
	around 0,5/ 1,5 kg	<b>1495.M2</b>	95,-

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	<b>1499.P</b>	68,-

#### 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	<b>1499.PM</b>	73,-

#### 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

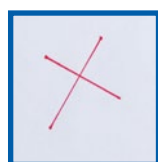
### ■ Base B for measurement / control of marked points

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

Description	Order-No.	Euro
Base B, for measurement	<b>1497</b>	74,-

#### INFO

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


[Table of contents](#)

[Print page](#)
[previous page](#)

[next page](#)
[step back](#)

[step forward](#)





## Stakeout with centering pin

The center punch / centering 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.

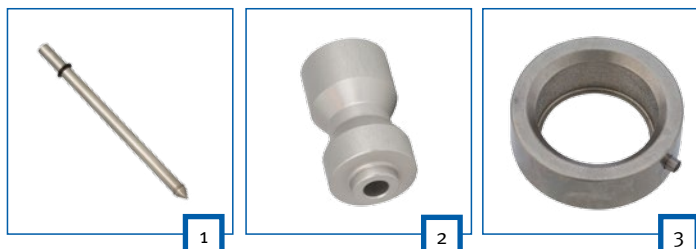
- Place the triangle frame over the point
- Push the centering pin several centimetres downwards out of the bearing-insert
- Locate the point with the tip of the centering pin, press the pin onto it
- Insert the bearing-insert into the base and center the triangular frame around the pressed-on pin
-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



### ■ Base C for use with centering pin

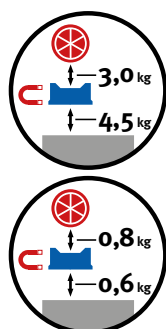
- Tolerance-free sliding of the centering pin in the bearing-insert
- Centering accuracy of the bearing-insert in the base  $\pm 0,1$  mm
- Center-punch/centering pin  $\varnothing 6 \times 100$  mm made of stainless steel (not magnetic)
- Hardened steel tip (magnetic)

Description	Order-No.	Euro
<b>Centering pin</b> with hardend tip [1]	<b>1498.S</b>	22,-
<b>Bearing-insert</b> for centering pin, for base C and CM [2]	<b>1498</b>	28,-
<b>Base C</b> for centering-pin / bearing-insert [3]	<b>1499</b>	59,-

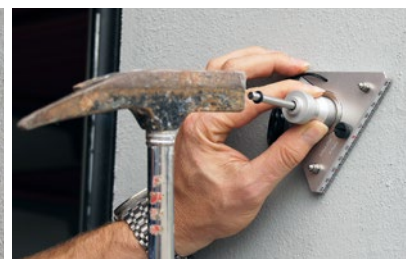
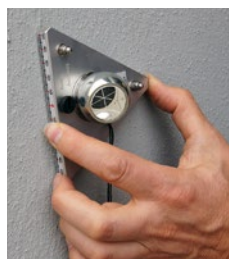


### ■ Base C with magnet

The integrated permanent magnet holds the ball securely in the base. This means that the triangular frame can also be used on walls.  
The base can be fixed in the frame with an Allen screw (SW4) (see picture).



Description	magnet. holding force	Order-No.	Euro
Base CM for bearing-insert, with magnet	around 4,5/ 3,0 kg	<b>1499.M</b>	69,-
	around 0,5/ 1,5 kg	<b>1499.M2</b>	65,-



## 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	40,-

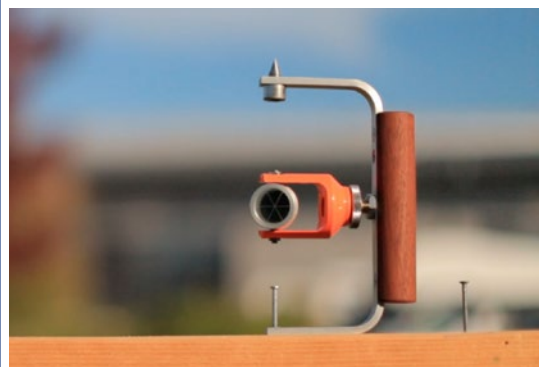


# Batter boards

## ■ Page 1 of 1

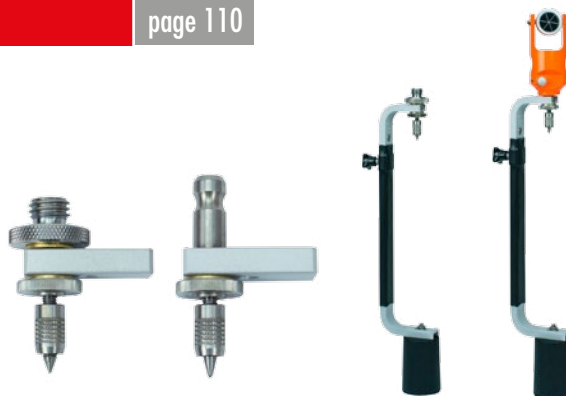
### D.1 Manual Reflector Holder

page 109



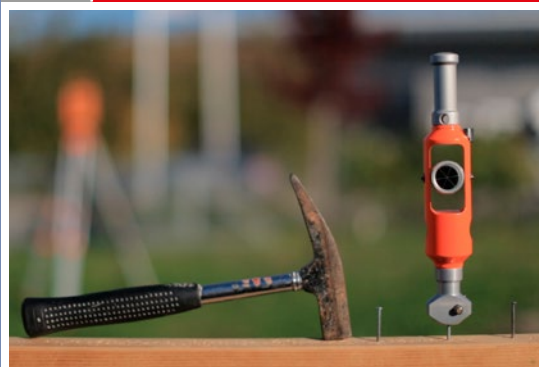
### D.2 Pendulum holder for prisms / reflectors

page 110



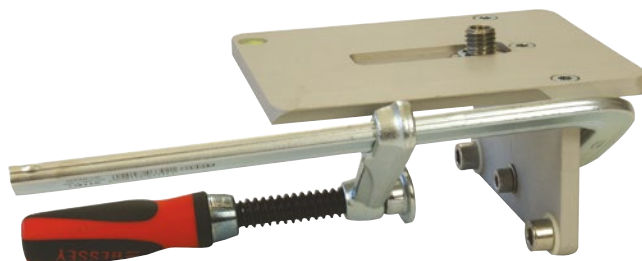
### D.3 Nail Prism Holder HIT

page 112



### D.4 Instrument Holder 5/8"

page 114

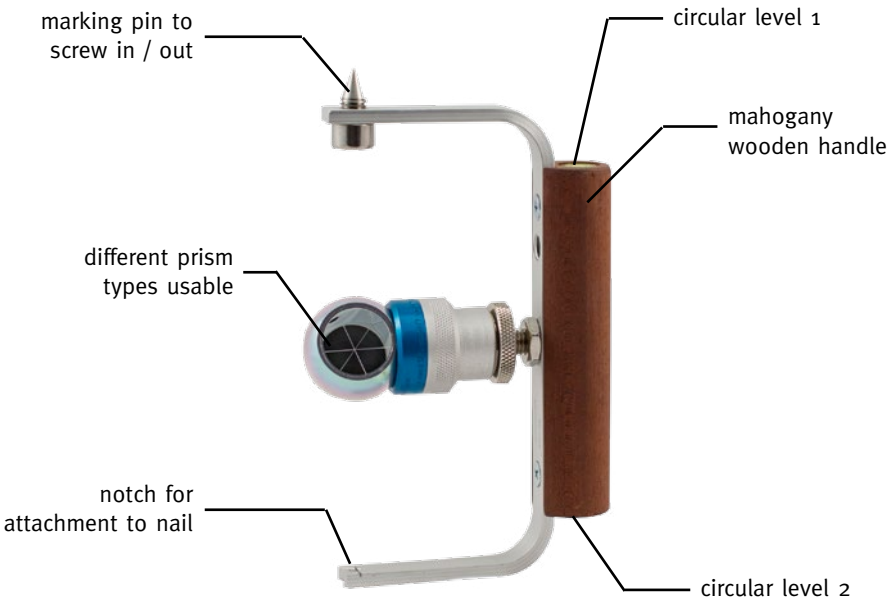




Manual Prism Holder



- One holder to stakeout (Fig. 1 and 2) and control (Fig. 3) the batter board nails
- Interchangeable 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 (page 15)
- ONRT 50 with mini prism MP24 or reflective foil (page 22)
- Ball prism base 5/8" (page 61) + ball prism (page 55)



Description	Order-No.	Euro
Manual Prism Holder Type T (without prism), 5/8"	0530	93,-

Type EZ

Special holder for Zeiss-Prism/Reflector ETR1

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

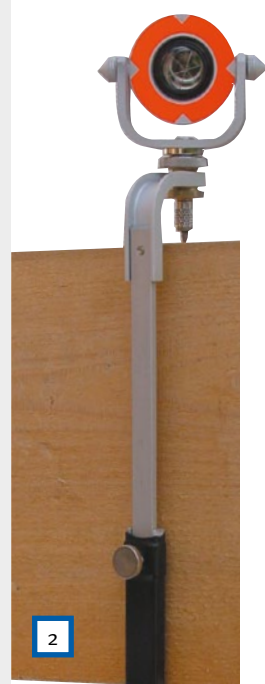


Description	Order-No.	Euro
Manual Prism Holder Type EZ (without prism)	0550	93,-



## 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

circular level to attach  
(sold separately)

**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 safely onto a nail, after a point has been staked out (Fig. 2)
- pendulum head can be removed within seconds from boom to use it separately to hold reflector manually (Fig. 3+4)



## Pendulum Holder for reflectors with 5/8" internal thread

Description	Order-No.	Euro
Pendulum Holder with 5/8" external thread	<b>0427</b>	164,-

## Pendulum Holder for reflectors with Leica spigot

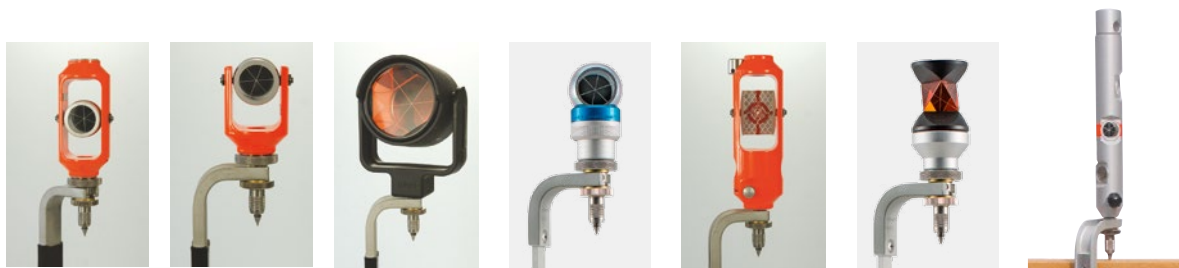
Description	Order-No.	Euro
Pendulum Holder with Leica spigot, Ø 12 x 27 mm	<b>0437</b>	164,-
Pendulum Holder with Leica spigot, Ø 12 x 40 mm	<b>0438</b>	168,-



product video



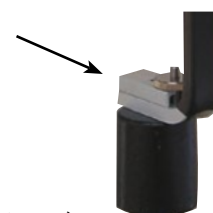
## APPLICATION EXAMPLES



## Accessories for Pendulum Holder

## Circular Level

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



Description	Order-No.	Euro
Circular Level for pendulum holder / pendulum head	<b>0140</b>	20,-



## Pendulum Head, singly

With integrated nail bit shell

Description	Order-No.	Euro
Pendulum head with <b>5/8" external thread</b>	<b>0121</b>	41,-
Pendulum head with <b>Leica spigot Ø 12 x 27 mm</b>	<b>0181</b>	41,-
Pendulum head with <b>Leica spigot Ø 12 x 40 mm</b>	<b>0181.4</b>	45,-

## 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



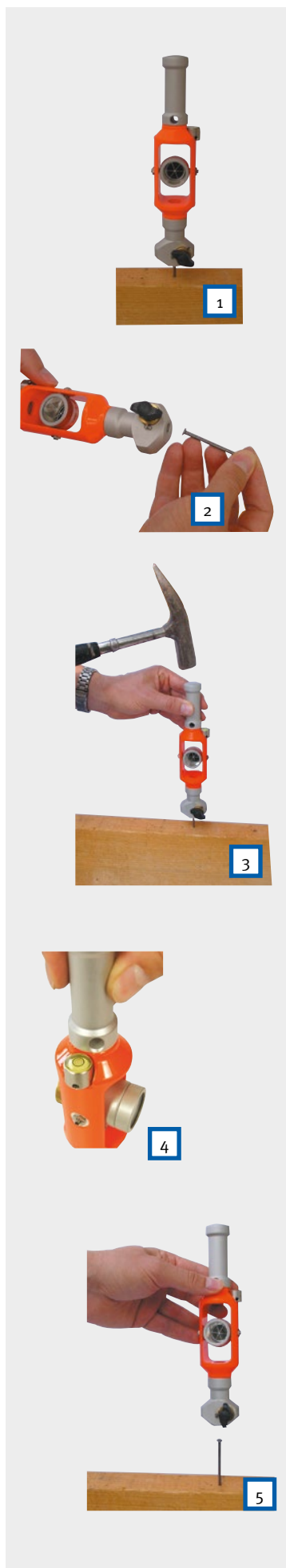
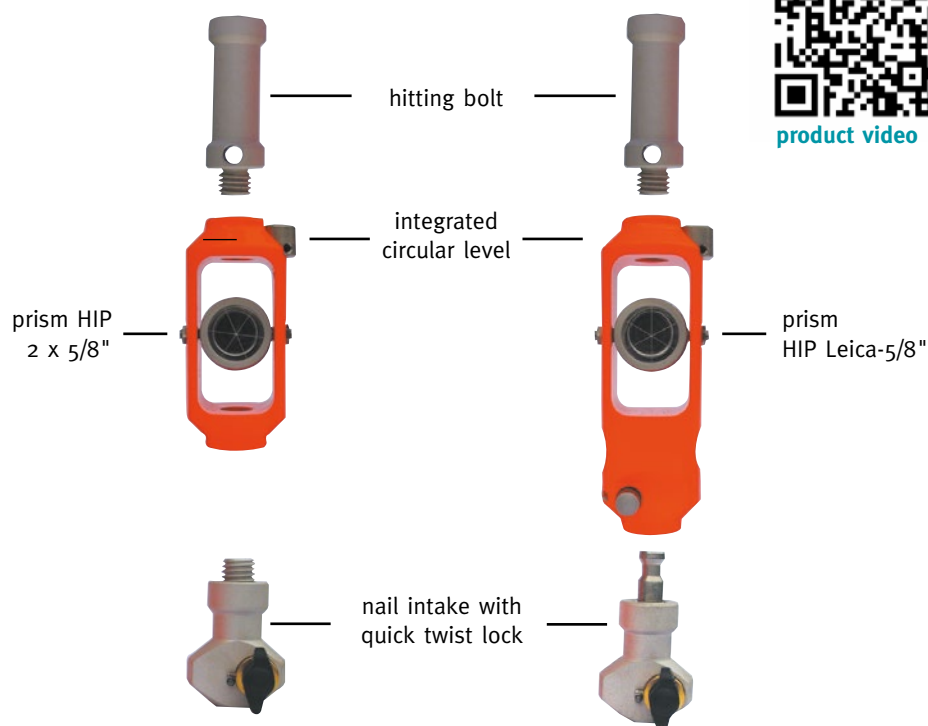
## Nail Holder Prism HIT

### ■ 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



product video



### ■ Advantages

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

■ With 2 x 5/8" internal thread



Description	Prism	Prism Constant	Order-No.	Euro
Nail Holder Prism HIT 5/8"	glass Ø 17,5 mm	-11,3 (Leica = +23,1) mm	4610.11	340,-
	glass Ø 25 mm	-16,9 (Leica = +17,5) mm	4610.17	340,-
	glass Ø 25 mm	-30 (Leica = +4,4) mm	4610.30	365,-
	glass Ø 25 mm	-34,4 (Leica = 0) mm	4610.34	370,-
	glass Ø 25 mm	-35 (Leica = -0,6) mm	4610.35	370,-

■ With Leica spigot on bottom and 5/8" int. thread on top

Description	Prism	Prism Constant	Order-No.	Euro
Nail Holder Prism HIT Leica	glass Ø 17,5 mm	-11,3 (Leica = +23,1) mm	4630.11	360,-
	glass Ø 25 mm	-16,9 (Leica = +17,5) mm	4630.17	360,-
	glass Ø 25 mm	-30 (Leica = +4,4) mm	4630.30	385,-
	glass Ø 25 mm	-34,4 (Leica = 0) mm	4630.34	390,-
	glass Ø 25 mm	-35 (Leica = -0,6) mm	4630.35	390,-



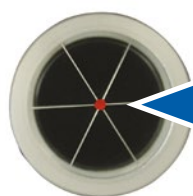
■ With prism constant K = 0 (only available with reflective foil)

Description	Prism Constant	Order-No.	Euro
HIT, with reflective foil 26 x 40 mm, 5/8"	0 (Leica = +34,4) mm	4615.0	254,-
HIT, with reflective foil 26 x 40 mm, Leica	0 (Leica = +34,4) mm	4635.0	279,-

INFO

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

MORE OPTIONS

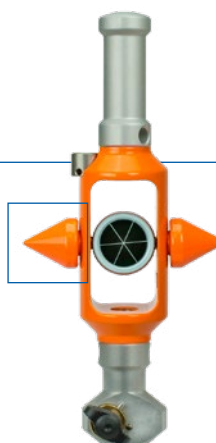


■ Tilting axis cones

- see [page 13](#)

■ Red marked prism center

- see [page 13](#)





## Instrument Holder

### With automatic centering over the axis nail.

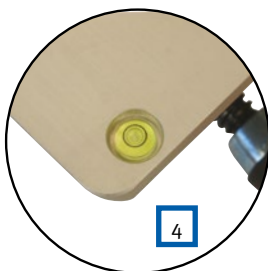
With the holder, any measuring instrument with 5/8" thread can be fixed quickly and stably on the batter board.

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.



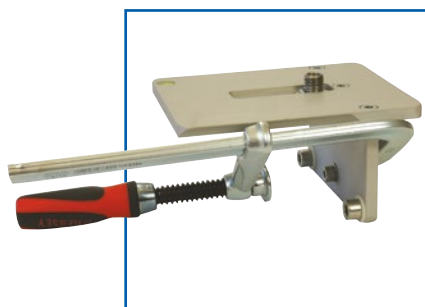
### ■ Handling

- 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 centers 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: <b>190 mm</b>	<b>o805</b>	185,-
Instrument Holder (5/8"), max. span: <b>290 mm</b>	<b>o806</b>	195,-



# Sewer Surveying „Vektor“

## ■ Page 1 of 1

### E.1 Universal Prism Pole System "Vektor"

Page 116

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



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

Page 125

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

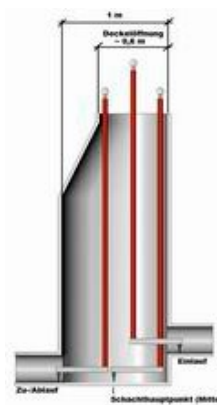
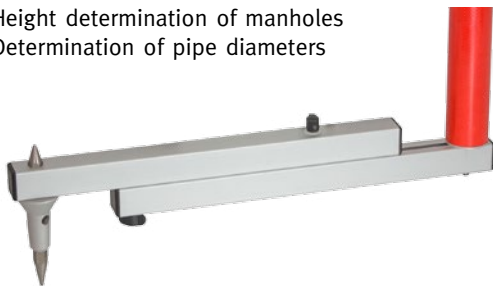


Table of contents



Print page

previous page

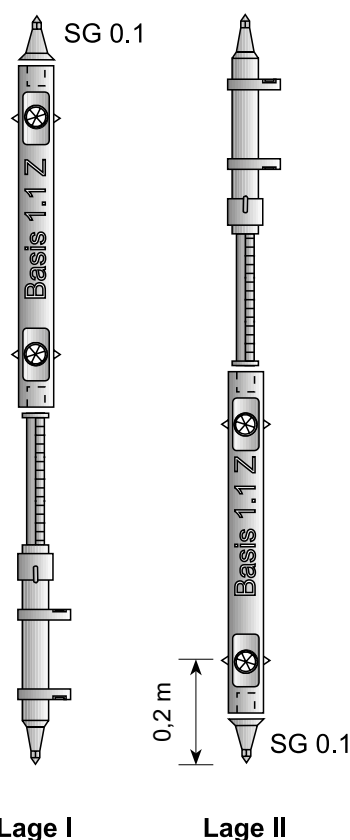


next page

step back



step forward



## 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 SGo.1 and the prism pole with a double level (see page 123). 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

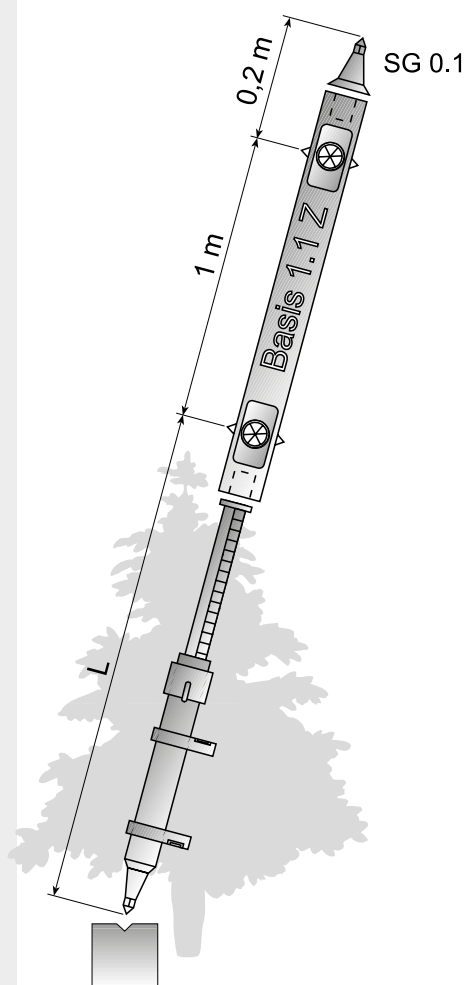
The combination vector base + standard prism pole is also ideally suited for measuring hidden points.

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 (tripods see page 124).**

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.



## 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 with the base 1.1W the connection to the extension Vo.8W or V1.8W is made with Leica spigots (Ø 12 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

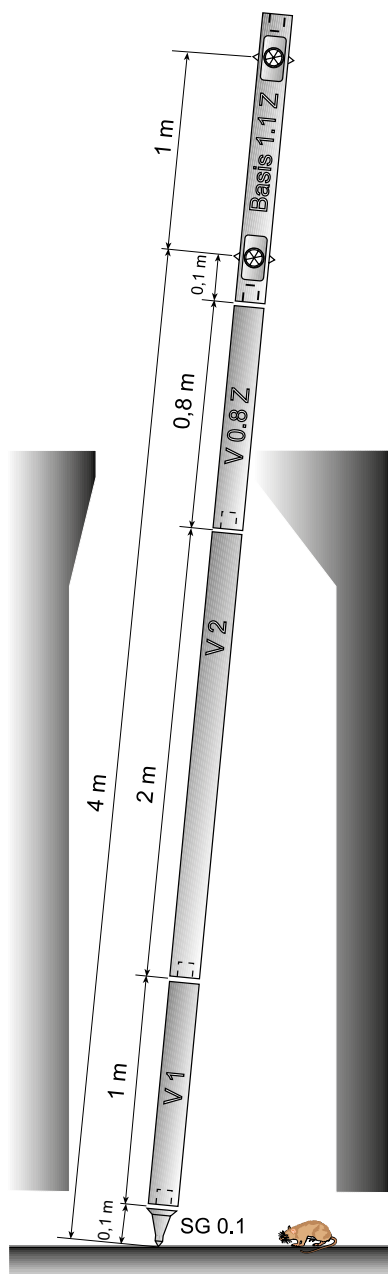
#### EXAMPLES

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

**Weight around 2,8 kg**

Base 1.1Z + 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

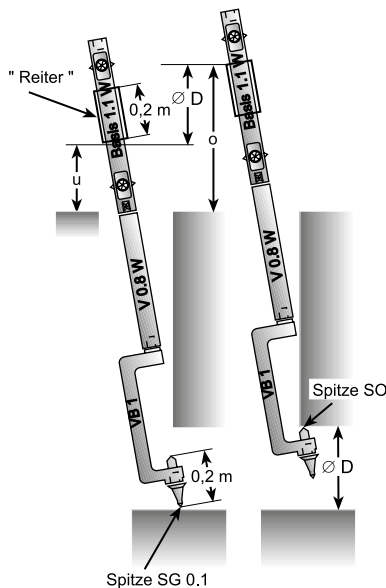
Often all channel data could be measured without going down the manhole if the determination of the nominal diameters of the sewer and the inlets would be possible from above.

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 apices

The internal diameter D can be determined for pipes with  $D > 0.2 \text{ m}$ .

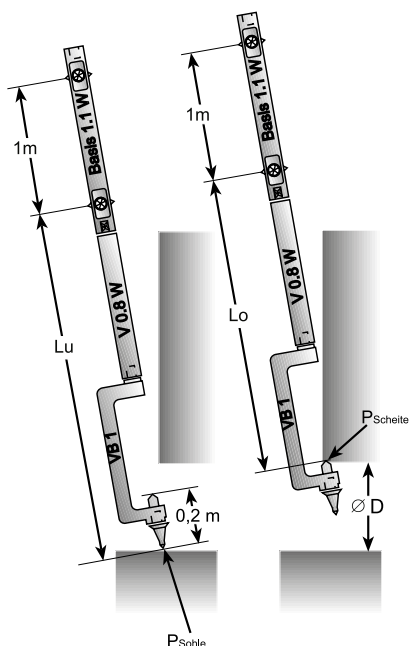
This is possible in 2 ways:



## 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).

- 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).
- 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).
- pipe diameters  $D = o - u$  (for example  $D = 1.3 \text{ m} - 0.9 \text{ m} = 0.4 \text{ m}$ ).



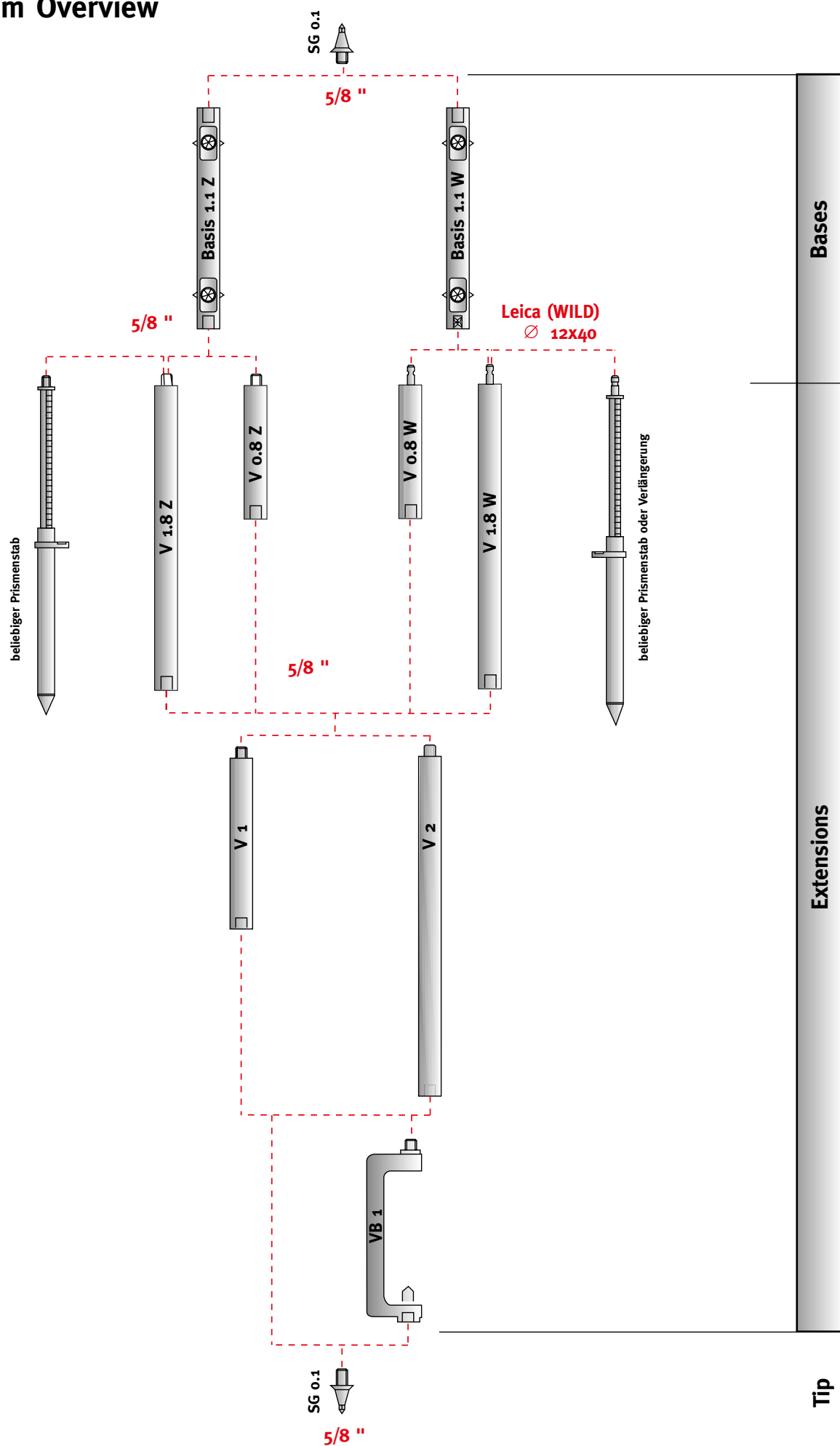
## 2. Determination with tachymeter

- Mount the sewer measuring pole with **tip SG 0.1** at the apex of the pipe.  
---> Calculation of coordinates X, Y, Z of point  $P_{\text{Sohle}}$  by measuring prism 1 and 2 and input of the extension dimension  $L_u$  (z. B.  $L_u = 2 \text{ m}$ ).
- Mount the sewer measuring pole with **tip SO** at the apex of the pipe.  
---> Calculation of coordinates X, Y, Z of point  $P_{\text{Scheitel}}$  analog point  $P_{\text{Sohle}}$  by input of the extension dimension of  $L_o = L_u - 0.2 \text{ m}$  (example:  $L_o = 1.8 \text{ m}$ ).
- Pipe diameter  $D = ZP_{\text{Scheitel}} - ZP_{\text{Sohle}}$

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



Bases

Extensions

Tip



Table of contents



Print page

previous page



next page

step back



step forward

## Material and Characteristics

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

### Composite: 100 % carbon fiber (carbon, CFK)

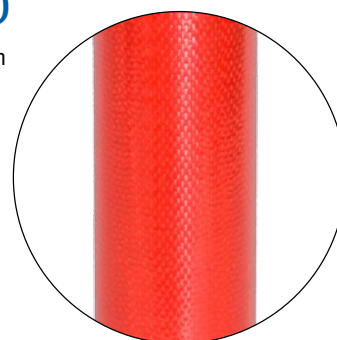
- Outer-Ø 44 mm, Inner-Ø 40 mm
- Unrivalled light (around 40% lighter than aluminium)
- High bending stiffness
- Not permanently deformable (100% resetting to original shape even after extreme stress)
- Around 100 times lower coefficient of expansion than aluminium (temperature)
- No corrosion
- Pleasant 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

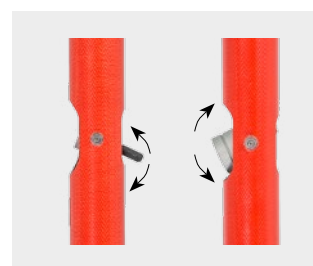


### Special features of the prism base

#### ■ 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



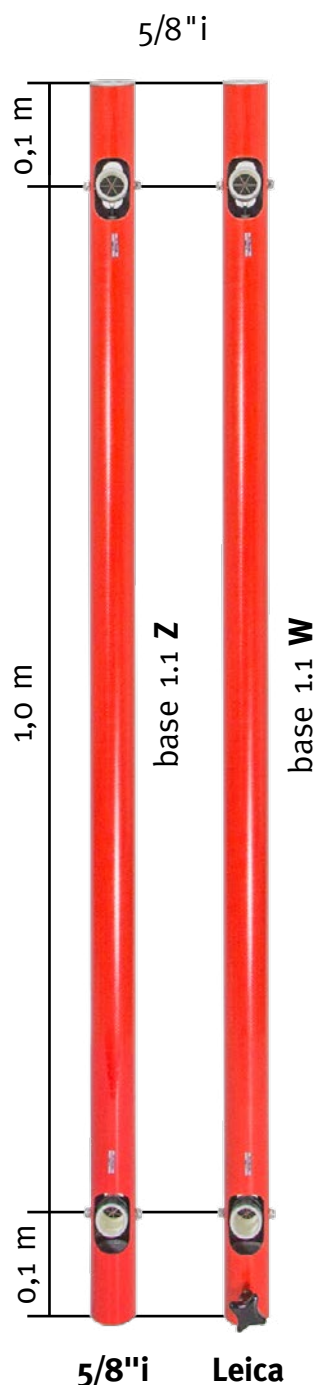
## Prism base for the Vektor System

- 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).

### ■ Bottom connection: 5/8" inner thread



Vektor Base 1.1 Z				
Material	approx. Weight	Prism Constant K	Order-No.	Euro
<b>100 % Carbon</b>	800 g	<b>-11,3</b> (Leica = +23,1) mm	<b>2002.11</b>	980,-
	800 g	<b>-16,9</b> (Leica = +17,5) mm	<b>2002.17</b>	980,-
	850 g	<b>-30</b> (Leica = +4,4) mm	<b>2002.30</b>	1.030,-
	850 g	<b>-34,4</b> (Leica = 0) mm <b>-35,0</b> (Leica = -0,6) mm	<b>2002.34</b>	1.040,-
<b>Hybrid Carbon / GFK</b>	820 g	<b>-11,3</b> (Leica = +23,1) mm	<b>3002.11</b>	880,-
	820 g	<b>-16,9</b> (Leica = +17,5) mm	<b>3002.17</b>	880,-
	870 g	<b>-30</b> (Leica = +4,4) mm	<b>3002.30</b>	930,-
	870 g	<b>-34,4</b> (Leica = 0) mm <b>-35,0</b> (Leica = -0,6) mm	<b>3002.34</b>	940,-

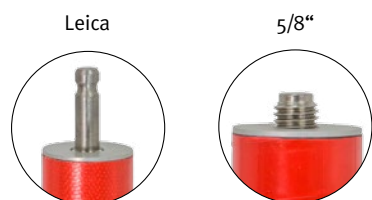
### ■ Bottom connection: Leica socket

The base is put onto the extension Vo.8W or V1.8W with the spigot connection. It is secured with a horizontal screw with star grip. All other extensions are screwed together with a 5/8" thread.

Vektor Base 1.1 W				
Material	approx. Weight	Prism Constant K	Order-No.	Euro
<b>100 % Carbon</b>	850 g	<b>-11,3</b> (Leica = +23,1) mm	<b>2004.11</b>	1.030,-
	850 g	<b>-16,9</b> (Leica = +17,5) mm	<b>2004.17</b>	1.030,-
	900 g	<b>-30</b> (Leica = +4,4) mm	<b>2004.30</b>	1.080,-
	900 g	<b>-34,4</b> (Leica = 0) mm <b>-35,0</b> (Leica = -0,6) mm	<b>2004.34</b>	1.090,-
<b>Hybrid Carbon / GFK</b>	870 g	<b>-11,3</b> (Leica = +23,1) mm	<b>3004.11</b>	940,-
	870 g	<b>-16,9</b> (Leica = +17,5) mm	<b>3004.17</b>	940,-
	870 g	<b>-30</b> (Leica = +4,4) mm	<b>3004.30</b>	990,-
	870 g	<b>-34,4</b> (Leica = 0) mm <b>-35,0</b> (Leica = -0,6) mm	<b>3004.34</b>	1.000,-







## 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 Vo.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.

#### ■ For bases 1.1 W with Leica socket

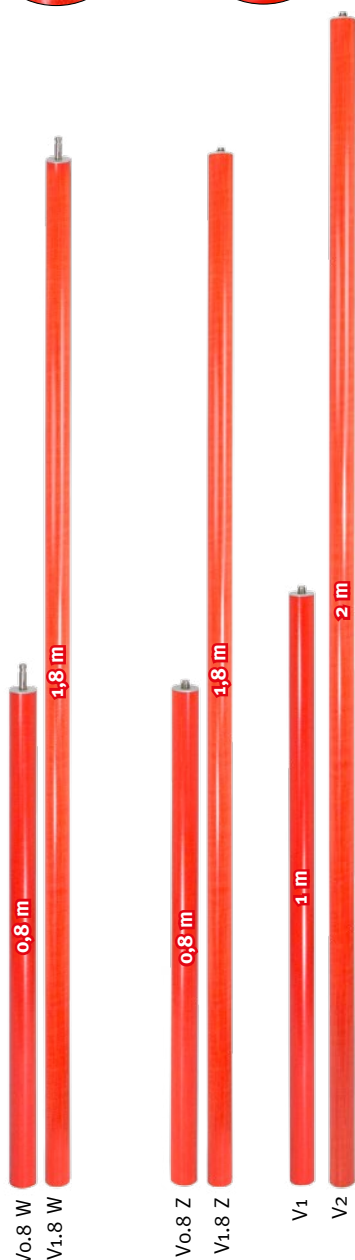
Description	Material	Weight	Order-No.	Euro
Extension <b>V 0.8 W</b> Length = 0,8 m	Carbon	450 g	<b>2014</b>	265,-
	Carbon / GFK	490 g	<b>3014</b>	195,-
Extension <b>V 1.8 W</b> Length = 1,80 m	Carbon	810 g	<b>2054</b>	410,-
	Carbon / GFK	890 g	<b>3054</b>	260,-

#### ■ For bases 1.1 Z with 5/8" inner thread

Description	Material	Weight	Order-No.	Euro
Extension <b>V 0.8 Z</b> Length = 0,80 m	Carbon	450 g	<b>2012</b>	265,-
	Carbon / GFK	490 g	<b>3012</b>	195,-
Extension <b>V 1.8 Z</b> Length = 1,80 m	Carbon	810 g	<b>2053</b>	410,-
	Carbon / GFK	890 g	<b>3053</b>	260,-

### Further extensions in m-steps

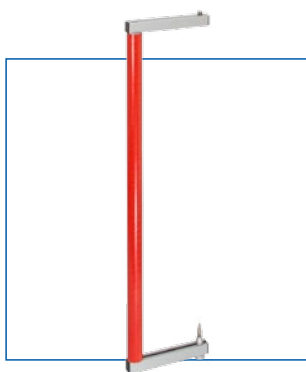
Description	Material	Weight	Order-No.	Euro
Extension <b>V 1</b> Length = 1,00 m	Carbon	500 g	<b>2051</b>	290,-
	Carbon / GFK	600 g	<b>3051</b>	205,-
Extension <b>V 2</b> Length = 2,00 m	Carbon	940 g	<b>2052</b>	440,-
	Carbon / GFK	1020 g	<b>3052</b>	270,-



### Tip

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

Description	Order-No.	Euro
Tip <b>SG 0.1</b> (around 120 g)	<b>2050</b>	41,-



## Measuring bracket VB1

### ■ For the determination of pipe diameters

Application description [see page 118](#).

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 <b>VB 1</b> Carbon (around 1100 g)	<b>2055</b>	425,-
Measuring bracket <b>VB 1</b> Hybrid - Carbon/GFK (around 1250 g)	<b>3055</b>	353,-

### INFO

Attention: When using the VB1 measuring bracket, it is necessary to use a base with Leica connection/spigot. [See page 121](#).



## Slider

For use at the base for the determination of pipe diameters [see page 118](#)

Plastic sleeve with Velcro fastener. Length 0.2 m.

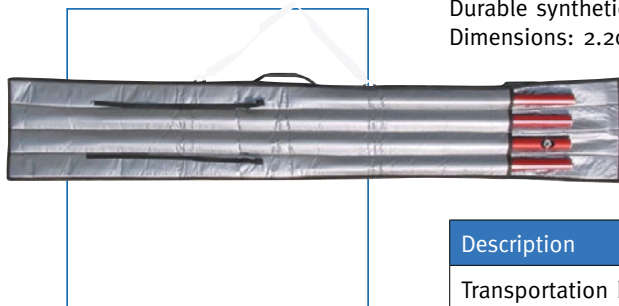
Description	Order-No.	Euro
Slider for Vektor base	<b>2056</b>	10,-

## 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	<b>2010</b>	60,-



## Pole adjustment holder FRG V

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

Description	Order-No.	Euro
Pole adjustment holder FRG V, for pole Ø 40-45 mm	<b>0950</b>	32,-



Table of contents



Print page

previous



next page

step back



step forward



## 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	<b>2095</b>	195,-



## 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 circular level EDL 10'	<b>2040.10</b>	70,-


[Table of contents](#)

[Print page](#)
[previous page](#)

[next page](#)
[step back](#)

[step forward](#)

## 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 [see page 117](#) 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.

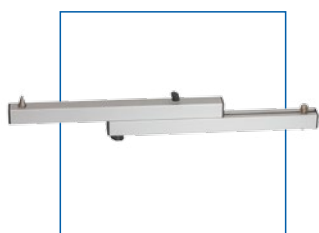
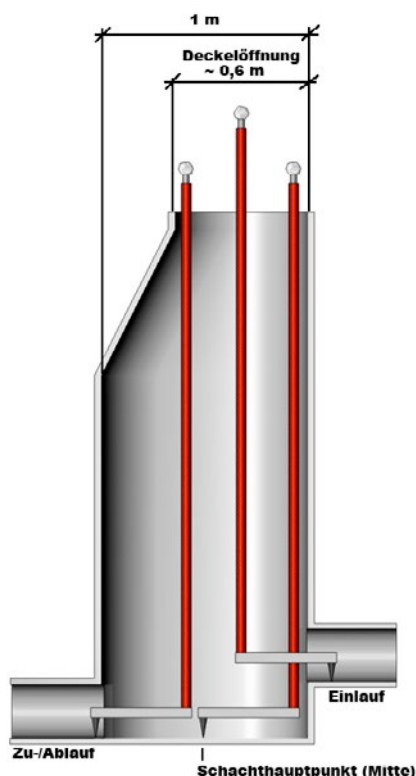
### Height determination of manhole points with boom

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

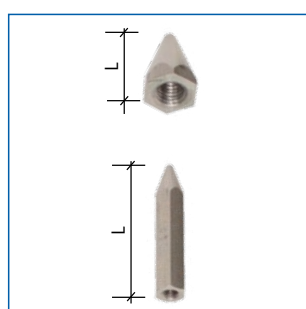
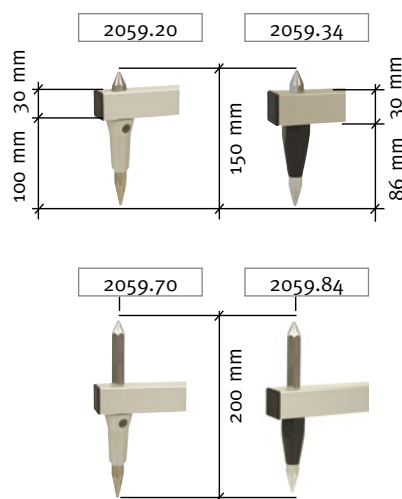
- Poles with 5/8" female thread at bottom and tips with 5/8" male thread, e.g. system Vektor
- Poles with 5/8" male thread at bottom and 5/8" female thread tips, e.g. many prism poles

### ■ 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, steplessly adjustable
- M8 stainless steel male thread centrally 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"	<b>2058</b>	139,-





## 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 SW14
- 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	<b>2059.20</b>	18,-
	100 mm	150 mm	<b>2059.20</b>	18,-
upper tip L = 34 mm	86 mm	150 mm	<b>2059.34</b>	18,-
upper tip L = 70 mm	100 mm	200 mm	<b>2059.70</b>	22,-
Obere Spitze L = 84 mm	86 mm	200 mm	<b>2059.84</b>	22,-

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  $P_{\text{Sohle}}$  and  $P_{\text{Scheitel}}$

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

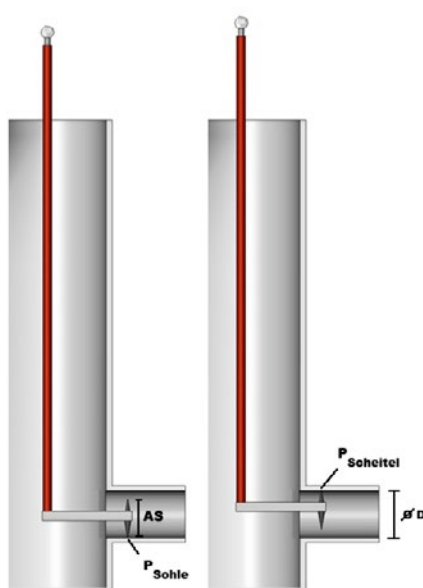
2. Determination of the heights (Z-coordinates) of point  $P_{\text{Sohle}}$  and  $P_{\text{Scheitel}}$  with the tachymeter by means of a prism attached to the pole.

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

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

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

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



# Building / Structure Surveying

## ■ Page 1 of 1

### F.1 Precision Prism 17.5 & Chamfer Prism Angle

page 128



### F.2 Flexible Prism Holder „gooseneck“

page 130

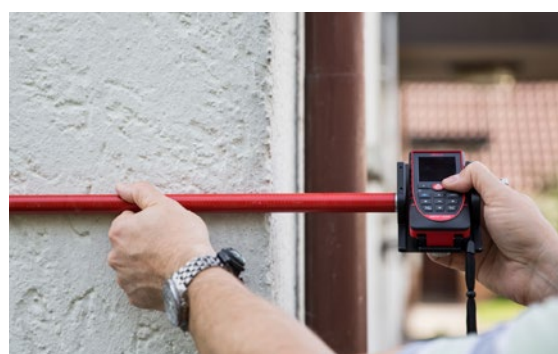


### F.3 Offset-Measurements of Building Corners

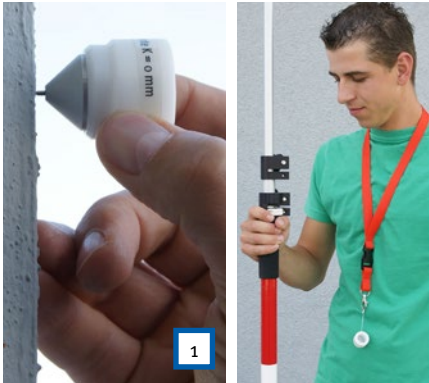
page 131



### F.3 Measurements of Building Dimensions



s. page 196



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:

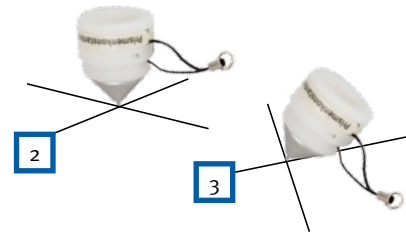
- 1. Aim at the object point with crosshairs.
- 2. Hold the prism in front of the object point with a known distance to the prism center.

Some commercially available mini prisms, e.g. our MP 24 mini prism, have a turned mandrel with a prism constant of  $K = 0\text{ mm}$  (Leica =  $+34.4\text{ mm}$ ) 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

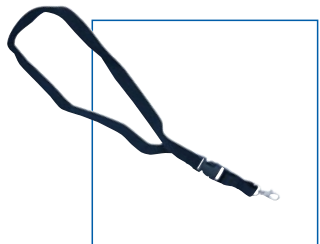


Features of the PP17.5

- Glass prism:  $\varnothing 17,5\text{ mm}$
- Grinding accuracy:  $2''$
- Reflection surfaces: silver mirrored at the back
- Casing: Outer- $\varnothing 22\text{ mm}$  made of anodized aluminium
- Range distance measurement: Up to over  $500\text{ m}$  (depending on device and weather conditions)
- Hardened steel pin as end-piece (no wear ergo no change in length)
- Prism can be inclined by  $45^\circ$  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 ( $K = 0\text{ mm}$ ), which is realized as a steel pin, is only  $11.3\text{ mm}$  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	135,-

Carrying strap

Description	Order-No.	Euro
Carrying strap, black	1390.S	5,-



## 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.

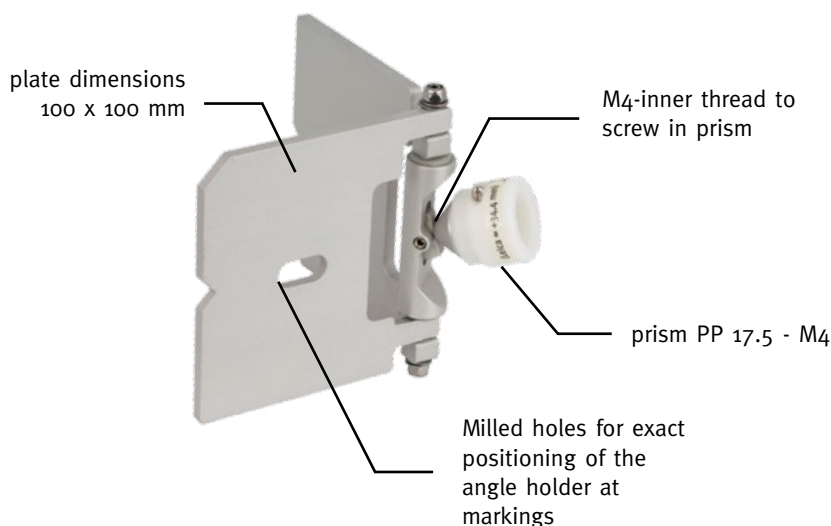
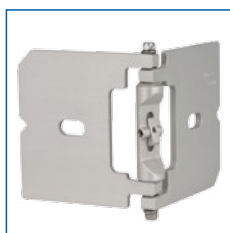
For these cases we developed the special **holder for concrete components with chamfers SBF**. It can be used for all components with a chamfer width of 20 mm or more and is ideally suited for the positioning of precast concrete elements as well as for the inspection of elements concreted on site.

### 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 ( <b>without prism</b> )	<b>1485</b>	235,-

### Precision Prism PP 17.5 – M4

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

Description	Order-No.	Euro
Precision Prism PP 17.5 – M4 with visor and protective cap	<b>1474</b>	135,-

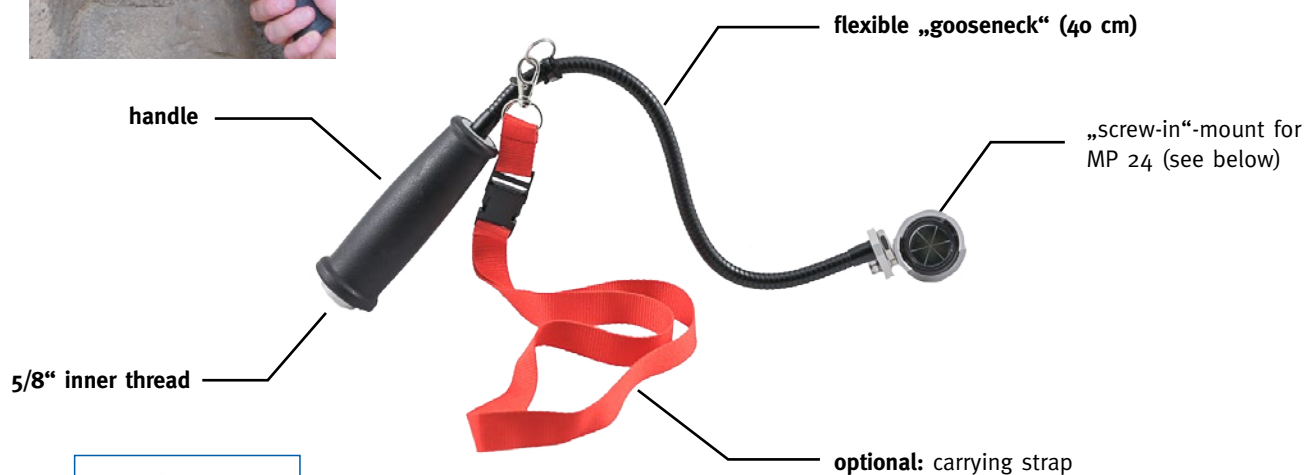
General information about the prism PP17.5 and its protective cap can be found on [page 128](#).





## 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

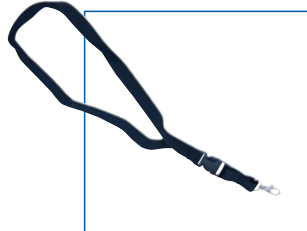


Description	Order-No.	Euro
Flexible prism holder „gooseneck“ (without prism)	<b>0741</b>	78,50



### Accessories

Description	Order-No.	Euro
Mini Prism MP24 (s. page 21)	<b>1400</b>	95,-



Description	Order-No.	Euro
carrying strap, black	<b>1390.S</b>	5,-

### INFO

Special equipment: Mandrel extensions [see page 24](#).



### 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 ([see page 40](#)).

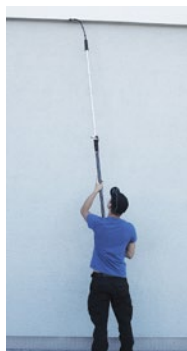


Table of  
contents



Print  
page

previous



next  
page

step  
back

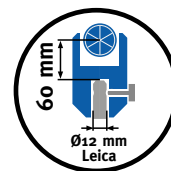


step  
forward



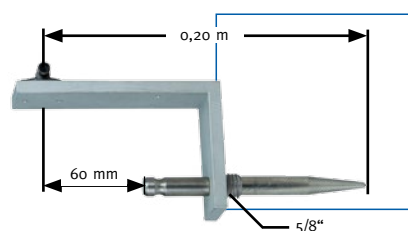
## Prism pole for corner offsets

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 offset“ 0,20 m, with Leica stud bolt	<b>5800</b>	135,-



## Pro-Leica-Adapter

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

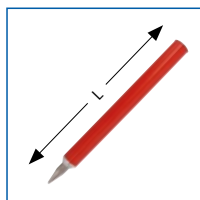
Description	Order-No.	Euro
Adapter Pro Leica – 5/8", for prisms with H = 50 mm	<b>0690</b>	48,-

### INFO

s. our prism series ONRT 50 s. page 20.

## 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	<b>5814</b>	45,-
Extension to 0,50 m for offset-pole, 5/8", L=392 mm	<b>5815</b>	50,-

## 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'	<b>1850</b>	34,-

# Track and Rail Surveying

## ■ Page 1 of 1

### G.1 Measurement of track position

page 133



### G.2 Surveying of Bolts (Catenary Supports)

page 134



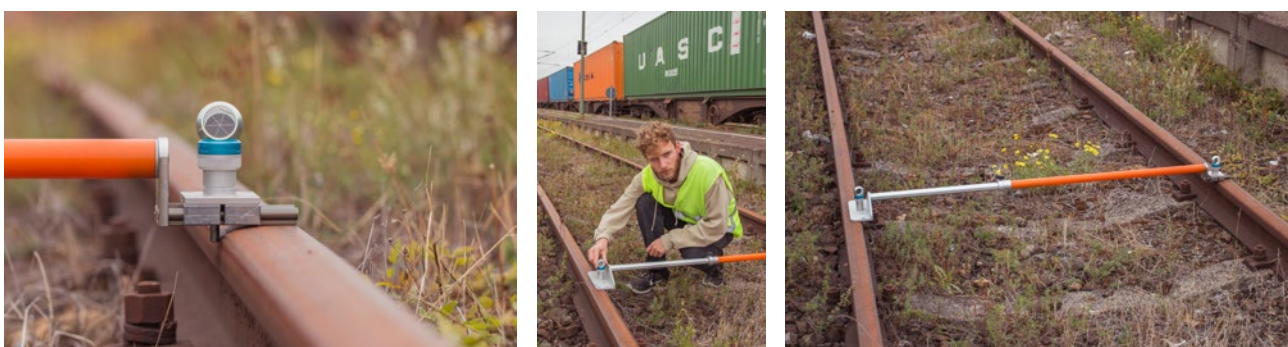
### G.3 Adapter for railway-angle SWPro and Bolt-Prism-Holders

page 136

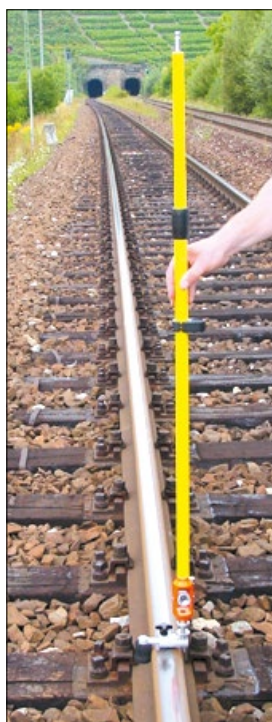
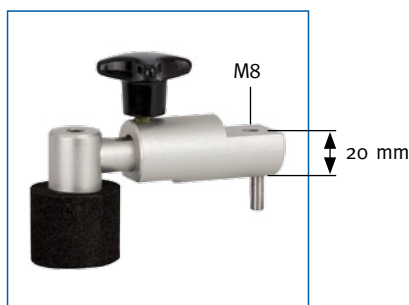


### G.4 Track Gauge

page 137







## 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**.

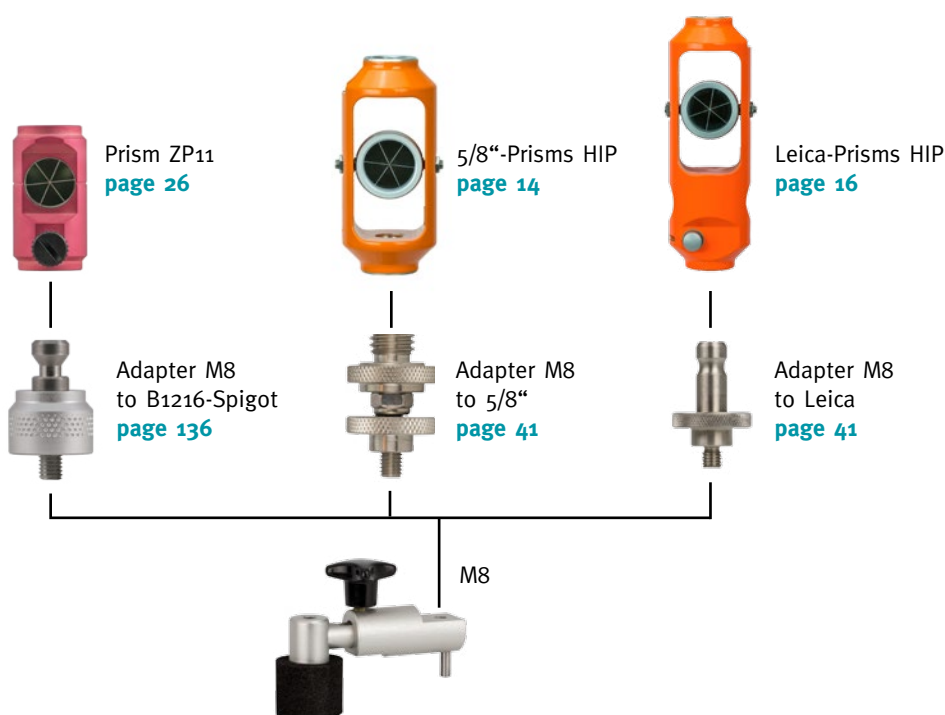
#### ■ Design and Advantages

- 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

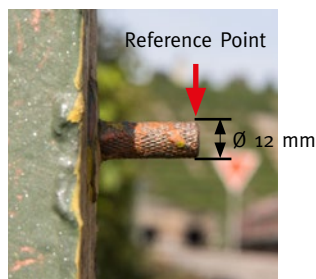
Description	Order-No.	Euro
<b>Rail Angle SW PRO</b> (without M8-Adapter)	<b>o800</b>	95,-

#### ON REQUEST

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



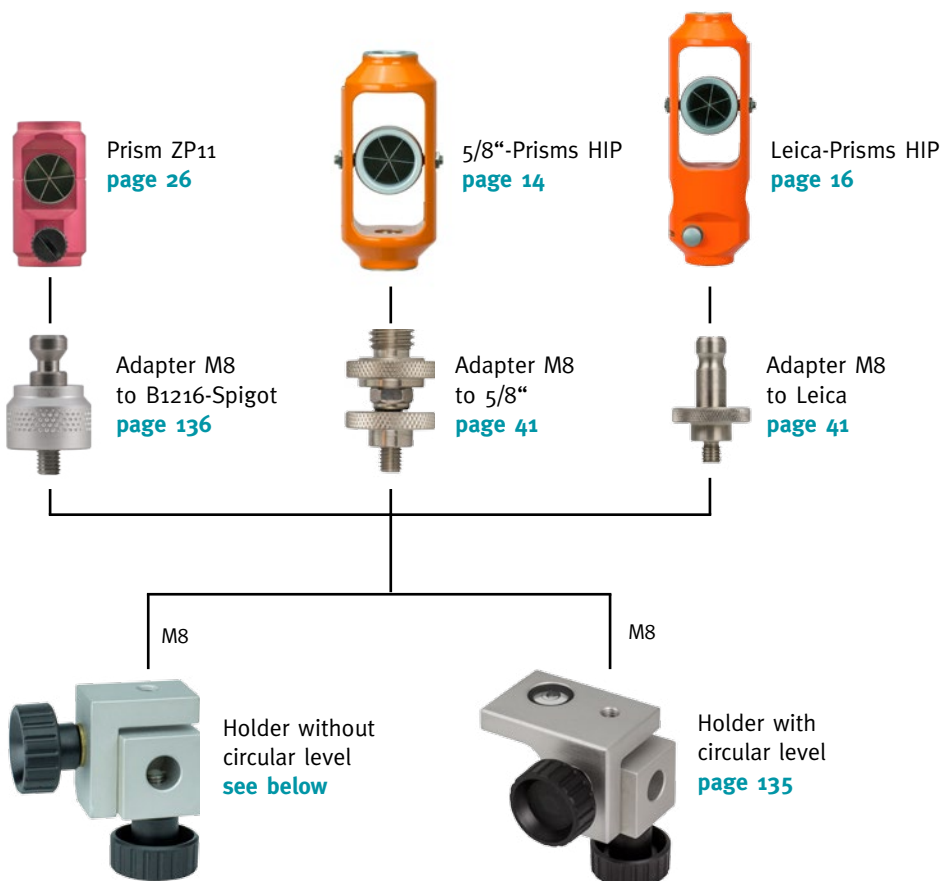




## Prism Holder for Surveying of Bolts

The holder can be used on all horizontal bolts ( $\varnothing$  12 mm), which are common on catenaries made of steel or spun concrete.

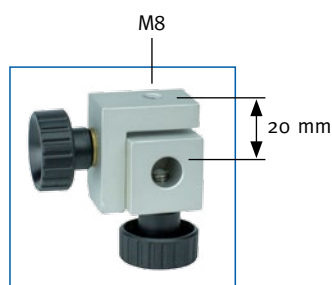
The prism centre lies at an exactly determined distance above the reference point (see picture). The holder is available with or without built-in circular bubble. Then the plumb line is positioned using the circular bubble on the upper side of the prism.



### 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
<b>Prism holder for horizontal bolts</b> without level (without M8-Adapter)	<b>0850</b>	139,-

### INFO

When using the holder 0850, the prism must be equipped with a circular bubble. HIP series: [Page 39](#). Cylindrical Prism ZP11: [Page 89](#).

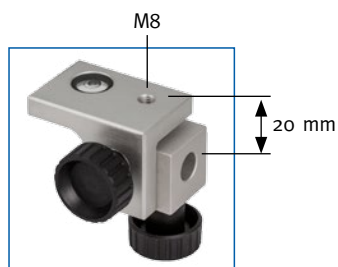


## Holder with integrated Circular Level

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 circular level from above

Description	Order-No.	Euro
<b>Prism holder for horizontal bolts, with circular level</b> (without M8-Adapter)	<b>o851</b>	149,-

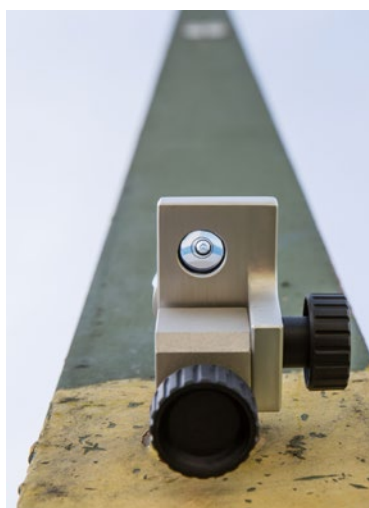
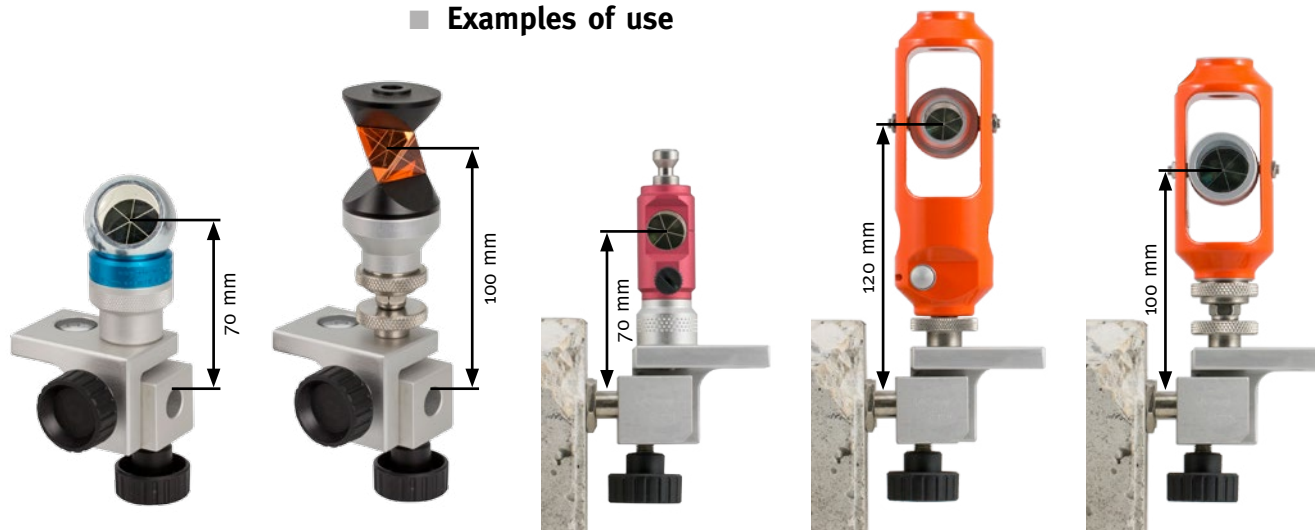


### ■ Holder with observation of the level from above or below

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
<b>Prism holder for horiz. bolts, with see-through circular level</b> (without M8-Adapter)	<b>o852</b>	155,-

### ■ Examples of use



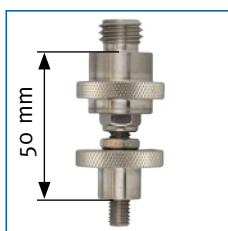
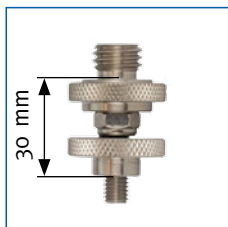
## M8-Adapter for various Prisms

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 41](#)

Description	Order-No.	Euro
Adapter M8 – 5/8", L = 30 mm (wall adapter WA 30)	<b>0820</b>	41,-

#### ■ Tilting Axis Height 120 mm

[more information s. page 41](#)

Description	Order-No.	Euro
Adapter M8 – 5/8", L = 50 mm (wall adapter WA 50)	<b>0810</b>	41,-



### For prisms with Leica socket Ø 12 x 27 mm

#### ■ Tilting Axis Height 120 mm

[more information s. page 41](#)

Description	Order-No.	Euro
Adapter M8 – Leica spigot St27 (wall adapter WA Leica)	<b>0830</b>	17,-



### Für Zylinderprisma ZP11

#### ■ Prism Center Height 70 mm

Description	Order-No.	Euro
Adapter M8 - B1216-Spigot	<b>6620.A</b>	25,-

#### ■ Examples of use





## Track Gauge System TGS

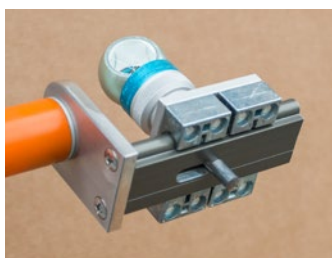
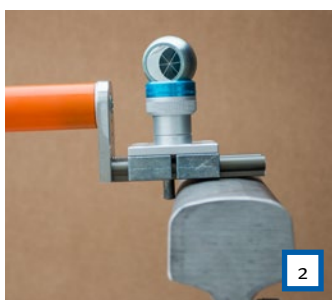
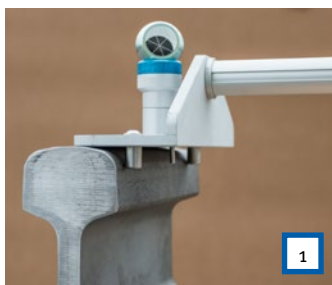
**Tachymetric determination of track gauges (950 to 1500 mm), superelevation and track axis.**

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 138](#)

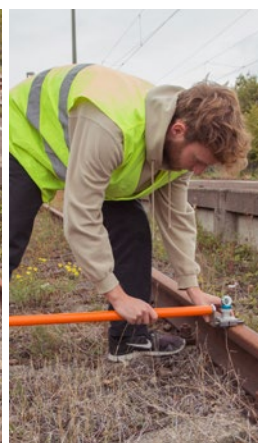
- Telescopic pole made of GFK and aluminium
- Quick adjustment of the pole (950 mm to 1500 mm) to the desired track width
- High stability with low weight
- Cylindrical outer pole made of 100% GFK:
  - Easy handling
  - **Electrically non-conductive**
  - Comfortable carrying even at low temperatures
- Measurement of the track gauge 14 mm below the rail top edge (RT), optionally convertible to 10 mm
- 1. Prism on the 1. rail: Fixed stop with double pin **[1]**
  - The large distance of 180 mm between the two stop bolts ensures safe right-angled alignment to the variable stop on the opposite side (2nd rail)
  - Distance between the two bolts can be shortened to 90 mm, e.g. for narrow curve radii for trams
- 2. prism on the 2. rail: movable slide **[2]**
  - A spring with 20 mm spring travel reliably presses the slide with the stop bolt against the reference point on the inside of the rail
  - Backlash-free slide bearing
- M8 thread for screwing on the two prisms / adapters
- Distance from RT (rail top edge) to screw-in surface of the M8 thread:  $30 \pm 0,1$  mm
- Approx. 35 mm clear height from RT to underside telescopic pole. Extendable to a clear height of 85 mm ([s. page 141](#))
- Weight: 2,0 kg (without prisms)



Description	Order-No.	Euro
Tachymetric Track Gauge System TGS, for track gauges of 950 to 1500 mm	<b>o802</b>	1.200,-

### 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.



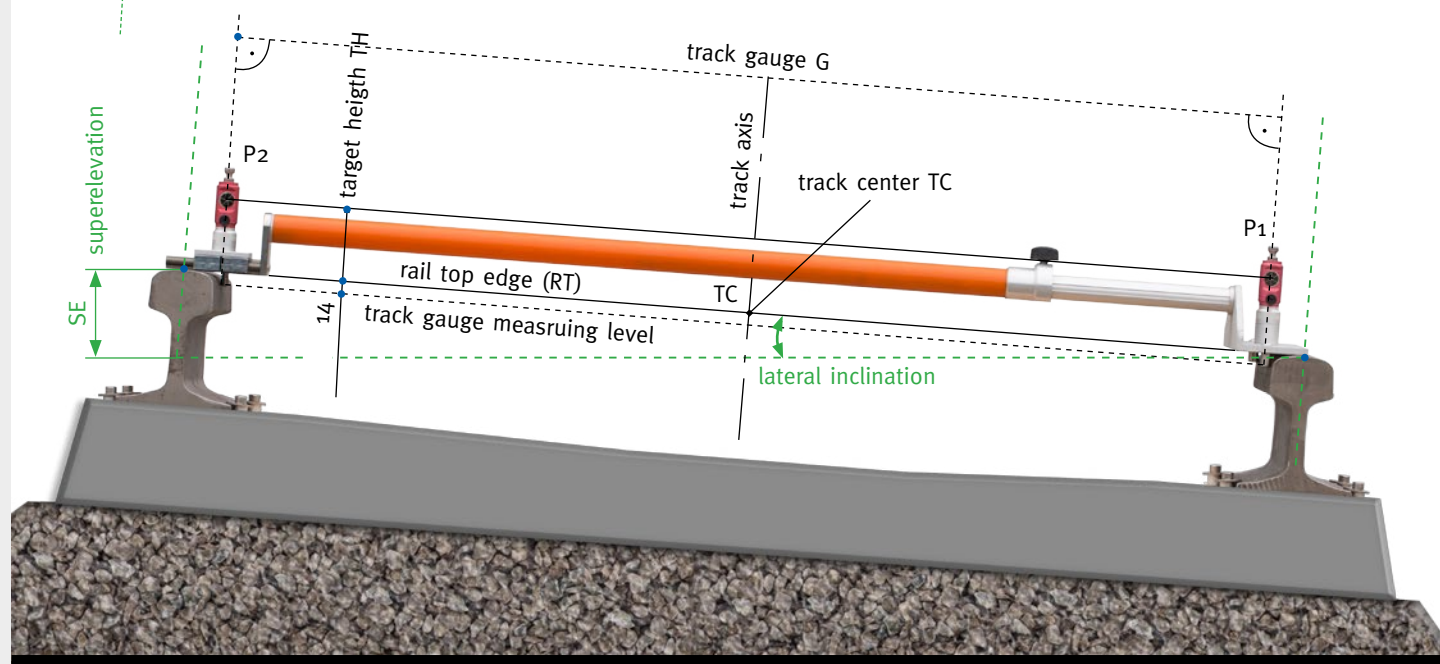
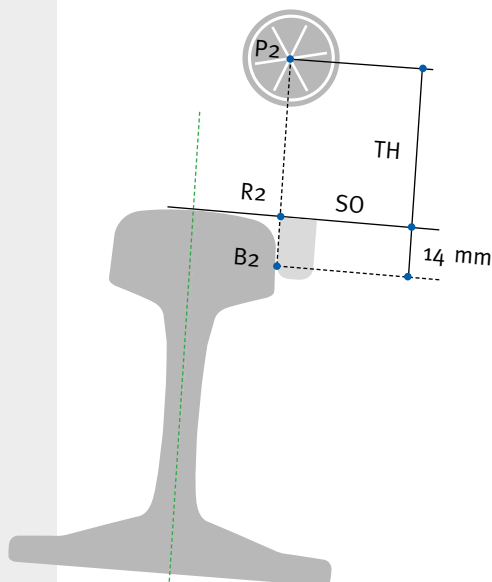


## Track surveying with the tachymeter

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 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.**

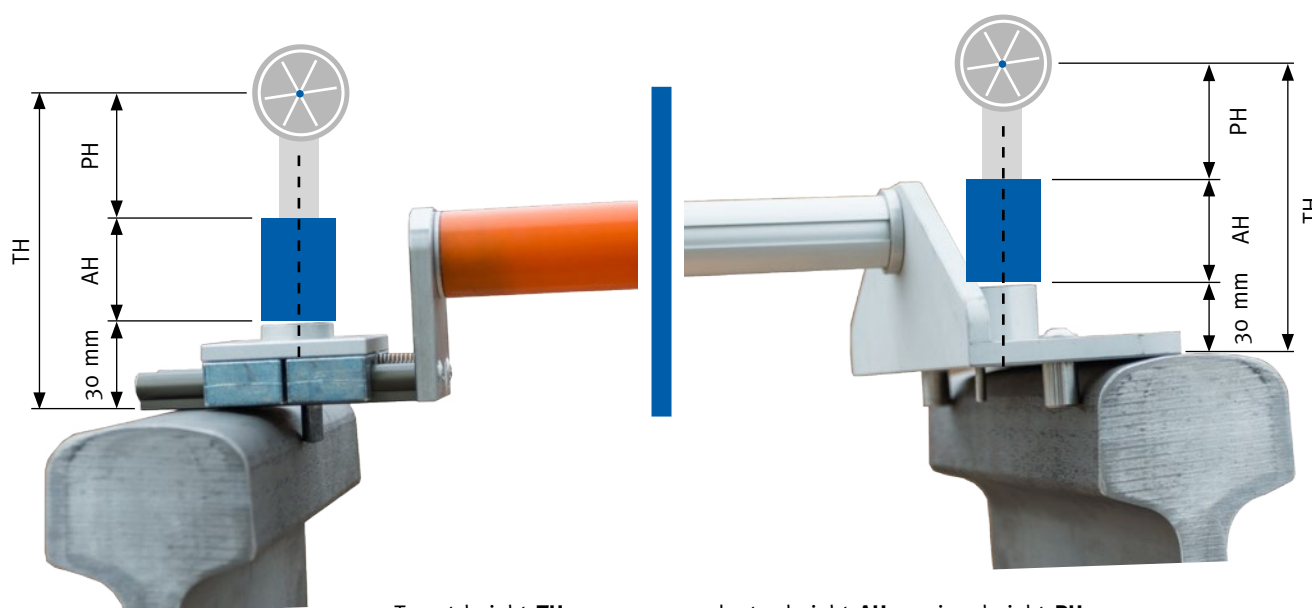
## M8 adapter for track gauge system for prisms and targets

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.

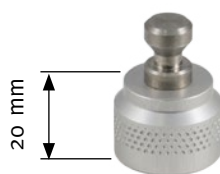
Our ball prism series and the ZP11 cylinder prism meet all these requirements. In addition, they have a very low overall height, which also increases accuracy.

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



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

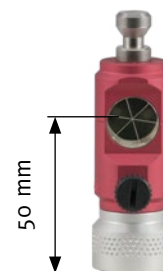
## Adapter and prisms for track gauge system TGS



### ■ Adapter M8a – Spigot B1216 [s. page 136](#)

**AH = 20 mm / TH = 80 mm**

For Cylinder prism ZP11



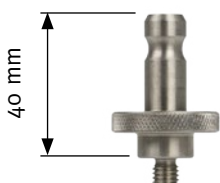
### ■ Base with M8 thread for ball-Ø30 mm [s. Seite 61](#)

**AH + PH = 50 mm / TH = 80 mm**



### ■ Base with M8 thread for ball-Ø1.5“ [s. page 61](#)

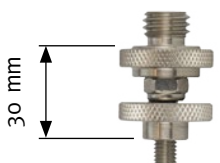
**AH + PH = 50 mm / TH = 80 mm**



### ■ Adapter WA Leica [s. page 41](#)

**AH = 40 mm / TH = 100 mm (when using Leica-prisms)**

For prisms with Leica bolt socket

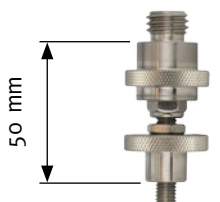


### ■ Adapter WA 30 [s. page 41](#)

**AH = 30 mm**

For prisms with 5/8“ inner threads

Examples: Bohnenstingl prism series HIP, ONRT, Zeiss KTR1



### ■ Adapter WA 50 [s. page 41](#)

**AH = 50 mm**

For prisms with 5/8“ inner threads

Examples: Bohnenstingl prism series HIP, ONRT, Zeiss KTR1



### ■ M8 centering plates [s. page 85](#)

**AH = 3 mm**

e.g. for ball prisms with magnetic bases ([s. page 61](#))



## Tracks with obstructions between the rails

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

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

### ■ Support extension for fixed stop

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



Description	Order-No.	Euro
Support extension 50 mm for fixed stop, 1 piece	<b>o803.D</b>	70,-

(2 pieces are required)



### ■ Support extension for movable slide

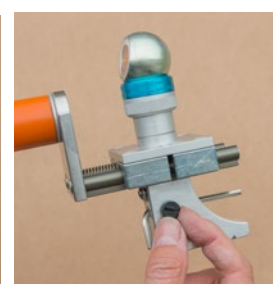
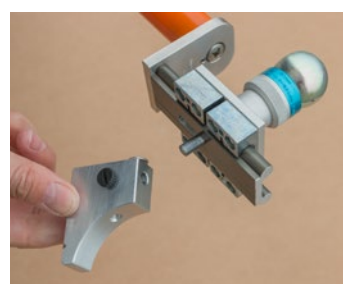
- To attach to the stop bolt of the slide
- Fasten with M6 Allen screw (SW 4). Key supplied
- Exact axial extension of the bolt Ø8 mm
- Bolt length 14 mm for stop at reference point
- Distance from TR to screw-in surface of the M8 thread for prism / adapter:  $80 \pm 0,1$  mm
- Clearance height from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



Description	Order-No.	Euro
Support extension 50 mm for movable slide	<b>o803.E</b>	85,-

#### 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	<b>o802.K</b>	95,-



# Computer Mounts

## ■ Page 1 of 1

### H.1 Panasonic FZ-G1 - Computer Mount page 144



### H.2 Getac T800 - Computer Mount page 148



### H.3 Panasonic FZ-M1 - Computer Mount page 145



### H.4 Getac F110 - Computer Mount page 149



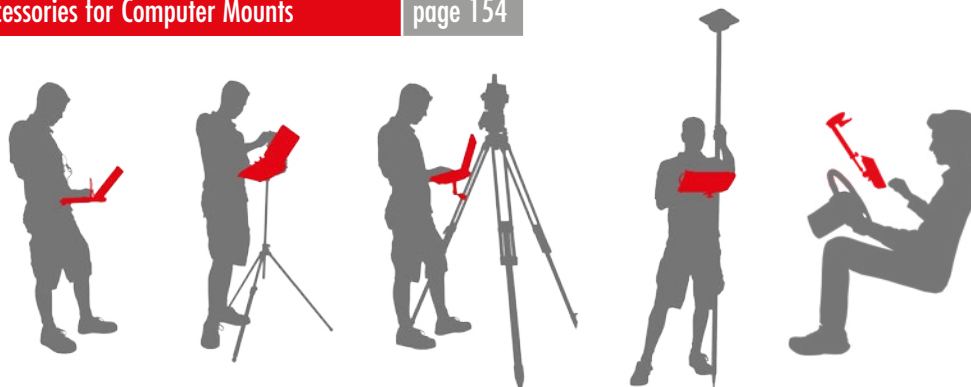
### H.5 Panasonic CF-20 - Computer Mount page 146



### H.6 ALOVAR Universal Computer Mounts page 150



### H.7 Accessories for Computer Mounts page 154







## Computer Mount for Panasonic FZ-G1

The FZ-G1 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



## Holder with threads or RAM mount

Description	Order-No.	Euro
Computer holder for Panasonic Fz-G1 with threads <b>M8, 1/4", 3/8"</b>	<b>5846</b>	175,-
Computer holder for Panasonic Fz-G1, with <b>RAM-1"-ball-mount</b>	<b>5846.R</b>	175,-

### ■ Features and Accessories

FZ-G1 in cars, [page 173](#)



stable clamping lever



Two connection options

back side



Threads M8, 1/4", 3/8"



RAM 1"-ball-mount

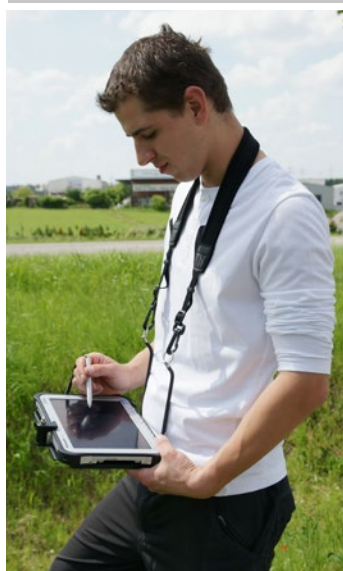
Pen holder, [page 174](#)



FZ-G1 on light tripod, [page 156](#)



FZ-G1 mobile, [page 170](#)

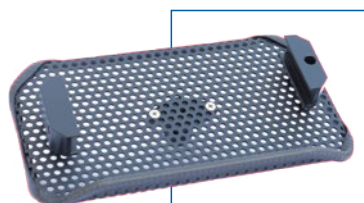


FZ-G1 on poles, [page 164](#)



FZ-G1 on tripod [page 166](#)





## 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

Description	Order-No.	Euro
Computer holder for Panasonic FZ-M1, with <b>RAM-Connection</b>	<b>5870.M1.R</b>	130,-



### ■ Features and Accessories

FZ-M1 in cars, [page 173](#)



Integrated pen holder



For transport the pen can also be stored inside the holders side part (see above).

FZ-M1 on light tripod, [page 156](#)



FZ-M1 mobile, [page 169](#)



FZ-M1 on poles, [page 164](#)



FZ-M1 on tripods, [page 166](#)



Table of contents



Print page

previous



next page

step back



step forward



## Mount for Panasonic Toughbook 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).



Fig. 1



Fig. 2



Fig. 3



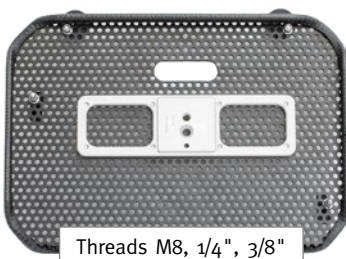
### ■ Features

- 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
- Time-tested accessories (etc.: pen holder, carrying strap, tripod attachments)
- Weight: 520 g



Fig. 4

### Holder with threads or RAM mount



Threads M8, 1/4", 3/8"



RAM 1"-ball-mount

Description	Order-No.	Euro
Holder for Panasonic CF-20, with threads <b>M8, 1/4", 3/8"</b>	<b>5870.CF20</b>	150,-
Holder for Panasonic CF-20, with <b>RAM-1"-ball-mount</b>	<b>5870.CF20.R</b>	150,-

T800 in cars, [page 173](#)



Pen holder, [page 174](#)



more accessories on the next [page 146](#)

CF-20 on light tripod, [page 156](#)



CF-20 on poles, [page 164](#)



CF-20 on tripods, [page 166](#)



CF-20 mobile, [page 170](#)



## 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



Fig. 1



Fig. 2

### Using only the display-part as a tablet

- Turn the disc with the positioning 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



Fig. 3



Fig. 4





## Computer Mount for Getac T800

The T800 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. Therefore 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 T800 can be used with or without snapback.

## Holder with threads or RAM mount

Description	Order-No.	Euro
Holder for Getac T800, with threads $\frac{1}{4}$ ", $\frac{3}{8}$ ", M8	<b>5870.T8</b>	110,-
Holder for Getac T800, with <b>RAM-1"</b> -ball-mount	<b>5870.T8.R</b>	110,-

### T800 in cars, [page 173](#)



### mounting possibilities

#### Thread Connection



#### RAM-Ball-Connection



### pen holder, [page 174](#)



### T800 on light tripod, [page 156](#)



### T800 mobile, [page 169](#)



### T800 on poles, [page 164](#)



### T800 on tripods, [page 166](#)



Table of contents



Print page

previous page



next page

step back



step forward



## 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
- Optional pen holder
- Optional attachment of a carrying strap
- Connection options: M8, 3/8" and 1/4"



## Holder with thread connection

Description	Order-No.	Euro
Computer holder for Getac F110, with threads M8, 1/4", 3/8"	<b>5870.F110</b>	152,-

F110 in cars, [page 173](#)



bottom connection threads

Thread connection  
M8, 1/4", 3/8"



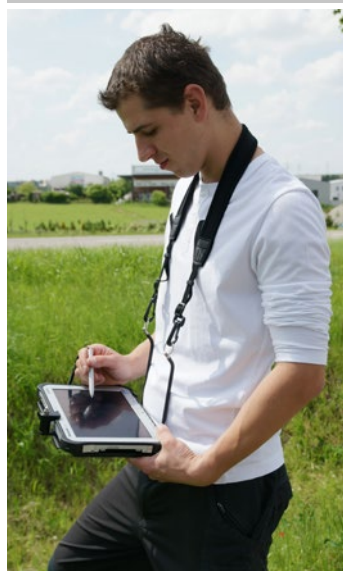
pen holder [page 174](#)



F110 on light tripod, [page 156](#)



F110 mobile, [page 170](#)



F110 on poles, [page 164](#)



F110 on tripods, [page 166](#)







## Universal Computer Mount ALOVAR for computers with a width of up to 270 mm

Even in surveying "normal", small computers, laptops and tablets are increasingly used. The holders available as standard for these computers are often not sufficient for the harsh conditions of use in surveying environments. Our ALOVAR series 270, S1 and S2, specially designed for outdoor use, are stable and can be used universally with tripods, RAM accessories and carrying straps.

- High-quality aluminium holder: sturdy and lightweight
- The computer lies protected in the holding shell
- Optional pen holder
- Variable application possibilities due to thread connections and RAM connection
- Two adjustable clamping levers enable fast locking and guarantee secure hold

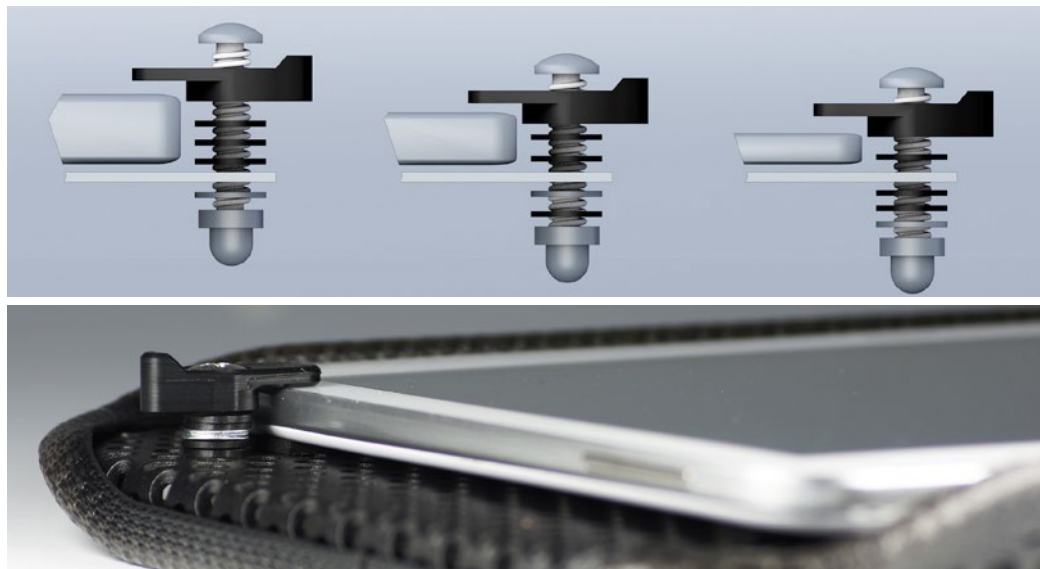
### Adjustable clamping levers

The tablet is fixed with two clamping levers at the height of the display. By simple repositioning of the plastic bushings, the clamping levers can be adjusted for any height in 1 mm increments up to the max. height of the order number.

ALOVAR in cars, [page 173](#)



adjustable clamping levers, [page 151](#)



ALOVAR on light tripod, [p. 156](#)



ALOVAR mobile, [page 169](#)



ALOVAR on poles, [page 164](#)



ALOVAR on tripods, [page 166](#)



Table of contents



Print page

previous



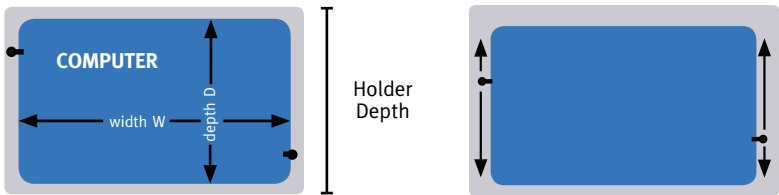
next page

step back



step forward

The positions of the the clamping levers can be located freely on the perforated plate, so that all the important inputs still remain accessible.



Holder ALOVAR 270, S1, S2 with thread connections

The adapter plate offers connection options for threads M8, 3/8" and 1/4".



	for computers up to		Holder ALOVAR				
Type	Width W	Depth D	Width	Depth	Weight	Order-No.	Euro
270	270 mm	200 mm	300 mm	230 mm	560 g	5870.270	110,-
S1	245 mm	185 mm	290 mm	215 mm	390 g	5870.S1	80,-
S2	242 mm	144 mm	285 mm	175 mm	315 g	5870.S2	80,-

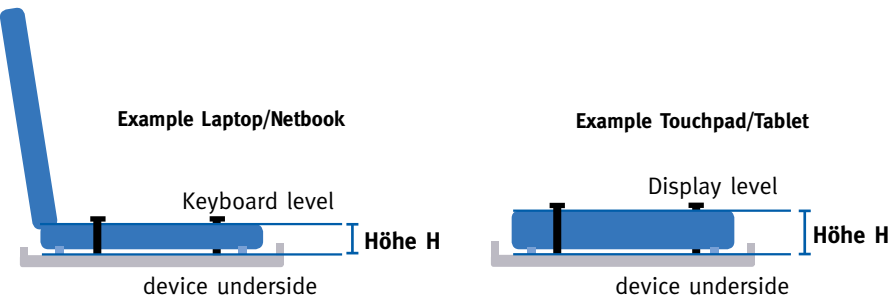
Holder ALOVAR 270, S1, S2 with RAM-1"-connection

With RAM-1"-ball connection.



	for computers up to		Holder ALOVAR RAM				
Type	Width W	Depth D	Width	Depth	Weight	Order-No.	Euro
270	270 mm	200 mm	300 mm	230 mm	560 g	5870.270.R	110,-
S1	245 mm	185 mm	290 mm	215 mm	390 g	5870.S1.R	80,-
S2	242 mm	144 mm	285 mm	175 mm	315 g	5870.S2.R	80,-

Find the right clamping lever for your computer



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

INFO

You need at least two clamping levers to securely fix the computer on the holder. The installation of the clamping levers is explained in detail in the instructions, which comes with the holder/lever.



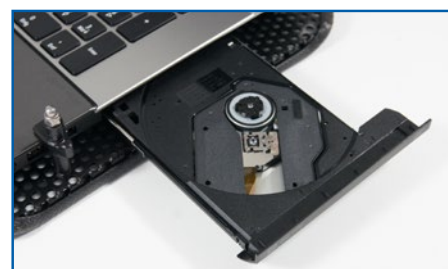
## Universal Computer Mount ALOVAR for computers with a width of 320 - 420 mm

The computer (laptop, netbook, touchpad) is inserted into the holder and firmly fixed by two clamping levers in seconds and secured against falling out. Transportation upside down is also possible. All interfaces remain freely accessible.

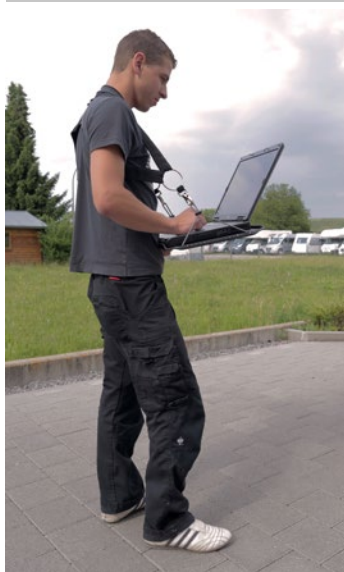
- Black powder-coated aluminium perforated plate
- Sturdy edge protection
- Two adjustable clamping levers
- Internal threads at the centre of gravity for connection to tripods, ball heads, GNSS and prism poles etc.:
  - "Photo thread" 3/8" with stainless steel adapter to 1/4"
  - M8 female thread

### Clamping Levers

The computer is clamped at the keyboard level for laptops or at the display level for touchbooks/pads. By simply repositioning plastic sleeves, the clamping levers can be adjusted for each height in 1 mm steps up to the maximum height of the Order-No. To determine the height H, please put the computer on a flat surface.



ALOVAR 420 mobile, [page 171](#)



ALOVAR 420 on tripod, [p. 156](#)



Table of contents



Print page

previous



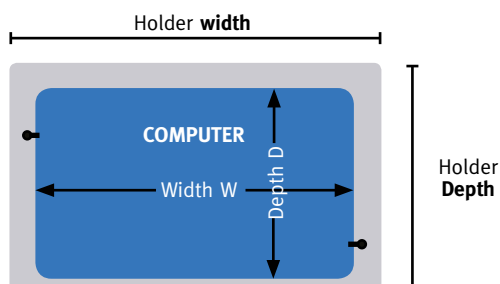
next page

step back



step forward



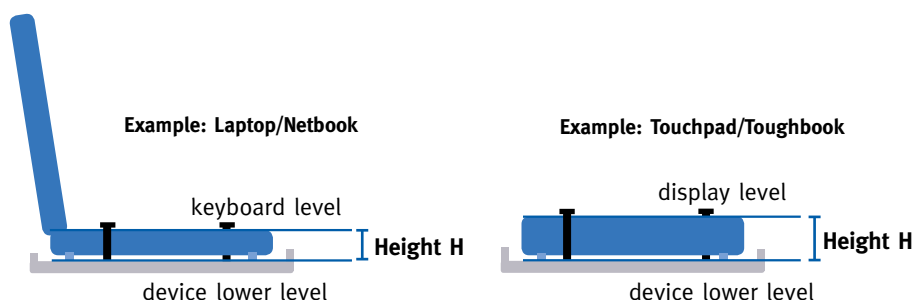


## Holder ALOVAR 320, 370, 420

	for computers up to		Holder ALOVAR				
Type	Width W	Depth D	Width	Depth	Weight	Order-No.	Euro
320	320 mm	225 mm	350 mm	265 mm	660 g	<b>5870.320</b>	125,-
370	370 mm	270 mm	400 mm	300 mm	760 g	<b>5870.370</b>	140,-
420	420 mm	300 mm	450 mm	330 mm	875 g	<b>5870.420</b>	155,-



## Find the right clamping lever for your computer



Description	Order-No.	Euro
Clamping lever up to height max. <b>17 mm</b> , 1 pc.	<b>5870.K0</b>	9,-
Clamping lever up to height max. <b>27 mm</b> , 1 pc.	<b>5870.K1</b>	9,-
Clamping lever up to height max. <b>37 mm</b> , 1 pc.	<b>5870.K2</b>	9,-
Clamping lever up to height max. <b>47 mm</b> , 1 pc.	<b>5870.K3</b>	9,-
Clamping lever up to height max. <b>57 mm</b> , 1 pc.	<b>5870.K4</b>	9,-

### INFO

You need at least two clamping levers to securely fix the computer on the holder. The installation of the clamping levers is explained in detail in the instructions, which comes with the holder/lever.



Table of contents



Print page

previous



next page

step back



step forward



# Computer Mount Accessories

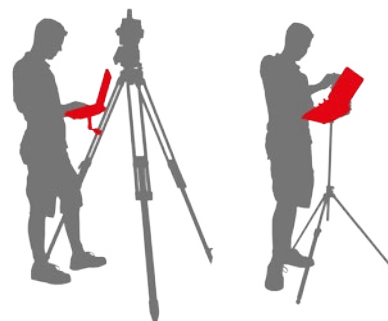
## ■ Accessories

Page 1 of 2

### H.7.1 Use with Lightweight Tripod or Instrument Tripod

page 156

- Easy Going Lightweight Tripod
- Ball heads/joints
- quick-change system
- RAM system
- Use on the instrument tripod
- Rotateable holder Uni168
- Hook and support joint
- Accessories



### H.7.2 Use with poles

page 166

- Slotted traverse
- Pole clamps
- Adapter for SECO clamps



### H.7.3 Mobile Use

page 168

- Carrying mounts
- Carrying straps



### H.7.4 Use in vehicles

page 173



# Computer Mount Accessories

## ■ Accessories

Page 2 of 2

### H.7.5 Additional Accessories

page 174

- Pen holder
- Positioning pins
- Mouse tray for ALOVAR mounts



Table of contents



Print page

previous page



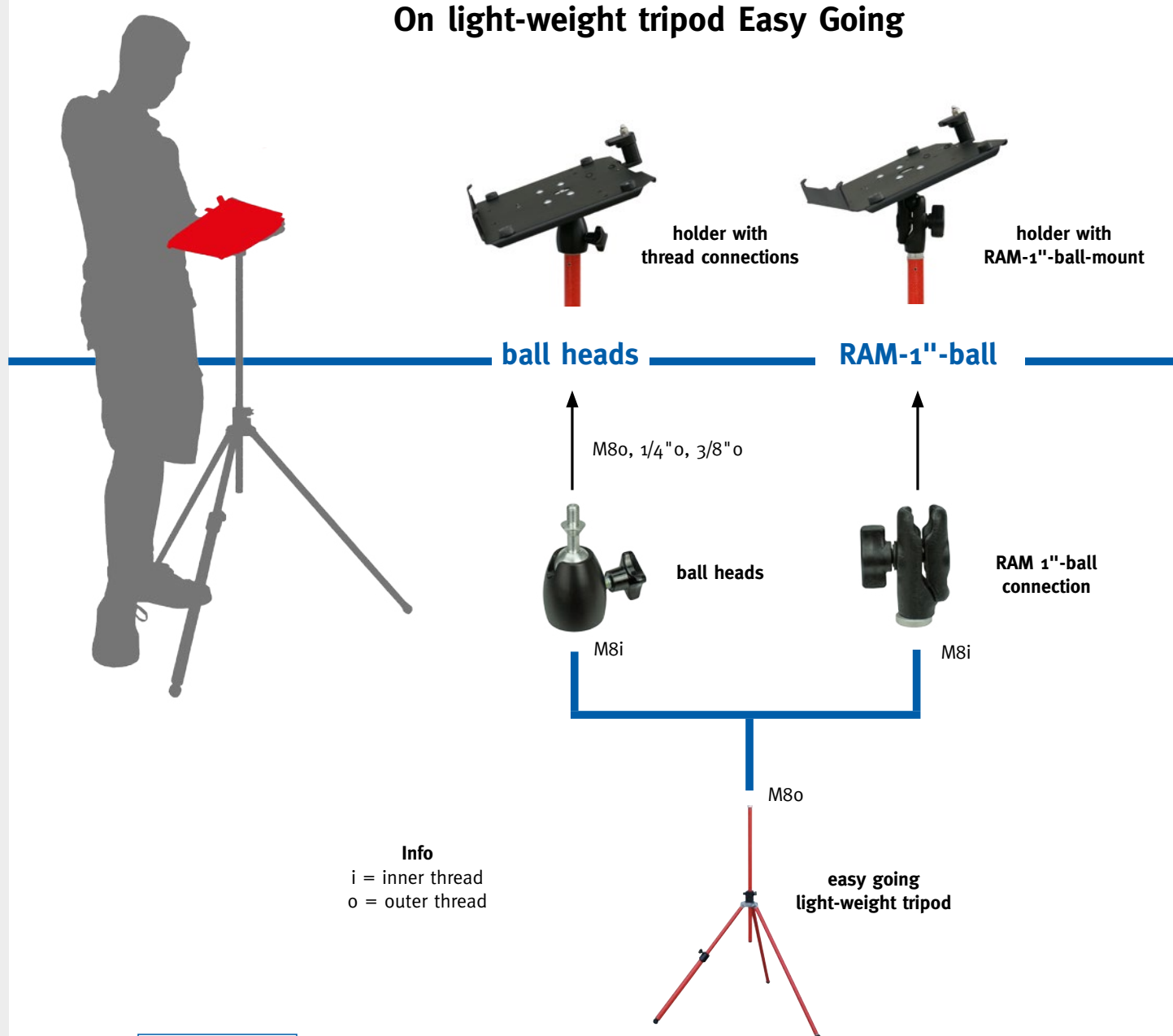
next page

step back



step forward

# On light-weight tripod Easy Going



Description	Order-No.	Euro
Light tripod "easy going" with <b>M8 outer thread</b> ( <a href="#">s. page 157</a> )	<b>5351.2</b>	220,-

Description	Order-No.	Euro
Ball head M8-15 ( <a href="#">s. page 158</a> )	<b>5081</b>	48,-

Description	Order-No.	Euro
Ball socket for <b>RAM 1"-balls</b> ( <a href="#">s. page 160</a> )	<b>4800.M8i</b>	45,-

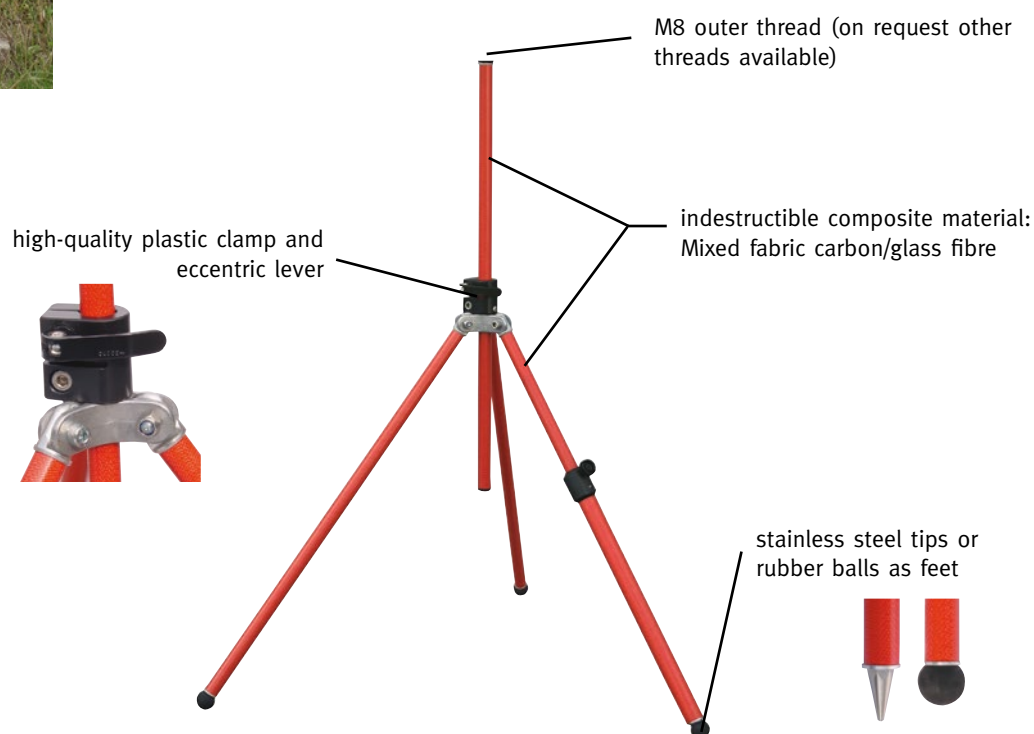


## Lightweight tripod "easy going"

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" <b>with stainless steel tips</b>	<b>5351.1</b>	220,-
Tripod M8 outer thread "easy going" <b>with rubber ball feet</b>	<b>5351.2</b>	220,-



## Spare parts: Tripod foot tips

Description	Order-No.	Euro
Stainless steel tips with M6 inner threads, 3 pieces	<b>5355</b>	20,-
Rubber ball feet Ø25 mm with M6 inner threads, 3 pieces	<b>5356</b>	20,-





## 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 <b>1/4"</b>	up to 1 kg	80 g	<b>5080</b>	45,-
Ball head <b>M8-15</b>	<b>up to 3 kg</b>	130 g	<b>5081</b>	48,-
Ball head <b>M8-35</b>	<b>from 3 kg</b>	250 g	<b>5082</b>	65,-
Ball head <b>3/8"</b>	from 3 kg	250 g	<b>5084</b>	65,-



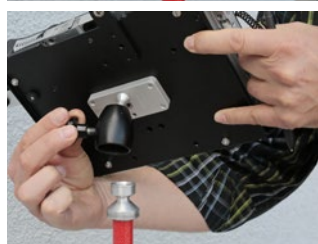
## Quick-change feature of the ball head

### Easy to change - for different applications

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	<b>5081.5</b>	16,-
Base part of the ball head M8-35	<b>5082.15</b>	20,-
Base part of the ball head 3/8"	<b>5084.15</b>	20,-



Table of contents



Print page

previous



next page

step back



step forward



## Quick-change System

With a quick-change system (consisting of a mount and quick-change plate) familiar from the photo-industry, the holder can be detached from the tripod and used elsewhere in a matter of seconds.



## Mount for quick-release plates

To screw onto tripods/ball heads with 1/4"- or 3/8"- external thread

- Sturdy aluminium construction
- 3/8" inner thread with adapter to 1/4" female thread
- With safety lever to protect against accidental opening of the clamping lever



Description	Order-No.	Euro
Mount for quick-release plates 1/4" and 3/8"	<b>5851.1</b>	25,-

## Quick-change plates 1/4" or 3/8"

To screw onto computer holders

- Sturdy aluminium construction
- No use of tools necessary



Description	Order-No.	Euro
Quick-change plate 1/4" outer thread	<b>5851.2</b>	18,-
Quick-change plate 3/8" outer thread	<b>5853.2</b>	18,-



## Ball joint "free move"

A strong spring creates a constant pressure on the ball of the joint. The computer can be positioned and operated without loosening and tightening a locking screw. This is the fastest way to adjust the computer by turning and tilting it for optimal operation and readability of the display.

Due to the cylindrical shape of the housing (Ø 32 mm), the "free move" can also be used on tripods with cylindrical mount.



## "free move" ball joint with M8 inner thread

- Top: M8 x 12 mm outer thread, stainless steel
- Bottom: M8 inner thread, stainless steel
- Only recommended for computer of up to 3 kg weight
- With M8 counter nut to secure the computer holder after screwing it on

Description	Order-No.	Euro
Ball joint "free move" M8	<b>6210.M8</b>	77,-



## RAM-System 1"-Ball

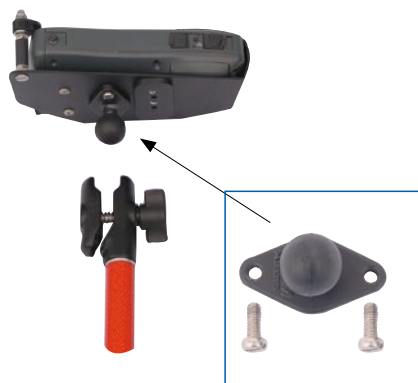
### Advantages

- The rubberized "RAM-1" ball serves as the starting point for the system, which is both simple to use and reliable in practice
- The loosening and fixing between RAM ball and RAM mounts is done by a big lever screw
- If the mounting screw is loosened enough, the ball (and the holder attached to it) can simply be removed. It is just as easy to insert and tighten the ball

### 1"-RAM-joint-ball to screw on

To use the double-jointed beam or the ball mount, the computers or computer holders have to be equipped with a 1" ball on the bottom side. Holders without a 1" ball joint can often be retrofitted.

- Rubberized 1" ball with two holes Ø 5 mm in the flange
- Two screws M5 x 10 mm
- Weight: 40 g



Description	Order-No.	Euro
Joint-ball Ø1" (25,4 mm), with two M5 screws	<b>5175</b>	13,50

### 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 <b>M8</b> inner thread (bottom)	<b>4800.M8i</b>	45,-
RAM 1" ball mount with <b>3/8"</b> inner thread (bottom)	<b>4800.38i</b>	45,-

### RAM joint-ball Ø1" with M8 thread

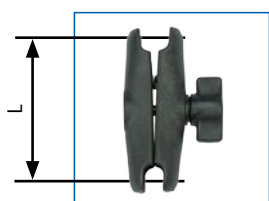
- For screwing into a computer holder with M8 internal thread to use a double-jointed beam
- M8 male thread
- Weight: 30 g



Description	Order-No.	Euro
RAM joint-ball Ø1", with M8 outer thread	<b>5175.M8A</b>	17,-

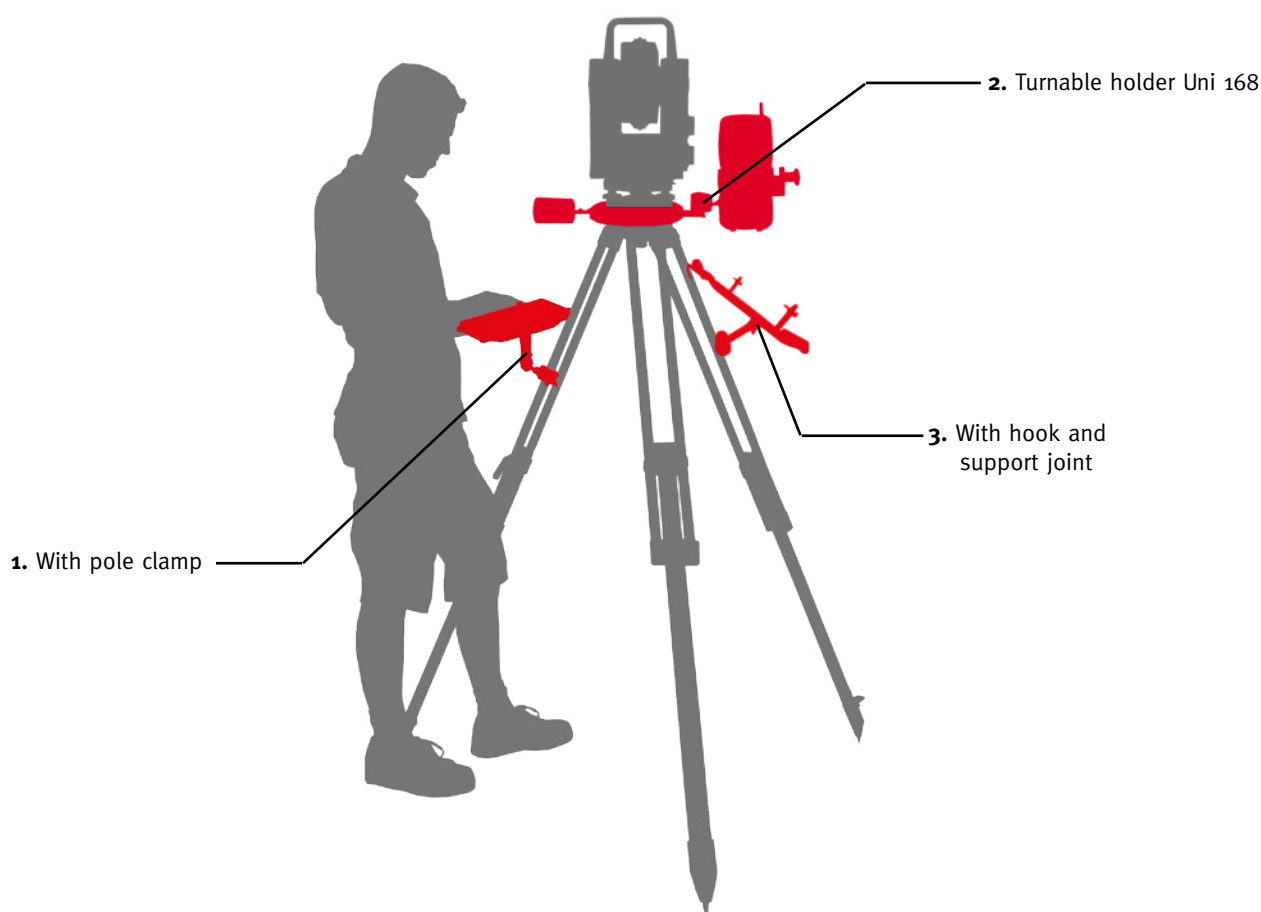
### RAM 1" double-jointed beam

- 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	<b>4805.05</b>	22,-
RAM 1" double-joint L=80 mm	max. 3 kg	130 g	<b>4805.08</b>	25,-
RAM 1" double-joint L=140 mm	max. 2 kg	230 g	<b>4805.14</b>	28,-

## Computer Mounts on Instrument Tripods



1. **Pole Clamp**  
Attachment to the tripod leg. The ball head / RAM system allows the display to be aligned in all directions.  
Further information can be found on [Page 164](#).

2. **Turnable Holder Uni 168**  
The rotatable holder is placed on the tripod head. A counterweight compensates for the computer mounted on the other side. 360° rotatable.  
Further information can be found on [Page 162](#).

3. **Hook and Support Joint**  
The hooks and the joint on the back of the holder are designed that the computer can be aligned at a comfortable angle. The holder, together with the computer, can be attached and detached in seconds.  
Further information can be found on [Page 163](#).



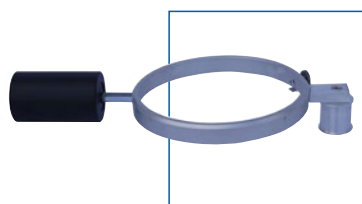


## Use with the instrument tripod

### Turnable holder Uni 168 for instrument tripod

For the use of holders for field computers up to 1.5 kg weight.

- Lateral cylinder Ø 32 mm for screwing on the pole clamp (can be mounted upwards or downwards). Suitable for clamps Ø 18-32 mm and Ø 32 mm, see [page 166](#)
- The removable counterweight has a boom length adapted to the computer weight. It ensures uniform loading of all tripod legs during rotation of the holder
- With fall protection when removing the field computer



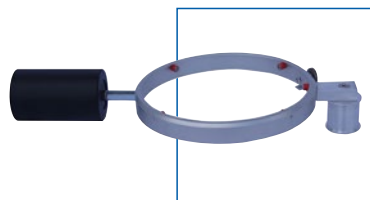
### For tripod-head-Ø 168 mm with turned edge or adapter ring



Description	Order-No.	Euro
Turn-holder System 168, for computers up to approx. 1 kg	<b>1900.1</b>	150,-
Turn-holder System 168, for computers up to approx. 1,5 kg	<b>1900.2</b>	152,-

#### INFO

The increased counterweight is achieved by a stronger leverage effect (longer boom of the weight), so the actual weight does not have to be increased.



### For tripod-head-Ø 168 mm without turned edge

With 5 plastic support points.



Description	Order-No.	Euro
Turn-holder System 168, for comp. up to 1 kg, 5 support points	<b>1900.1P5</b>	170,-
Turn-holder System 168, for comp. up to 1,5 kg, 5 support points	<b>1900.2P5</b>	172,-

When the tribrach is mounted centrally, the holders 1900.1P5 and 1900.2P5 can be set to the tripod head plate and rotated 360°!



top view



#### TIP

For heavy computers we recommend the use of our lightweight tripod "easy going" [s. Page 156](#).



Table of contents



Print page

previous



next page

step back



step forward



## 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 <b>ALOVAR</b> -holders*	<b>5382.L</b>	30,-
Hook especially designed for Panasonic <b>FZ-G1</b> holder	<b>5382</b>	30,-
Hook especially designed for Panasonic <b>CF-20</b> holder	<b>5383</b>	32,50

\* ALOVAR 320, 370, 420, Getac F110 holder



### Support Joint

- Tilting angle adjustable with wing screw
- Upholstery of the support with sponge rubber cover
- Mounting on the back of the holder with 1 knurled nut
- Weight: 100 g

Description	Order-No.	Euro
Support joint for <b>ALOVAR</b> holders*	<b>5381.L</b>	65,-
Support joint for Panasonic <b>FZ-G1</b> holder	<b>5381</b>	65,-

\* 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", <b>M8</b> outer thread	<b>3035.1</b>	42,-
Tripod plate 5/8", <b>3/8"</b> outer thread	<b>3035.3</b>	42,-

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 158](#).



## Computer Mounts on Prism-/ GNSS-Poles



Holders with  
thread connections



Holders with RAM-1"  
ball-connection

ball head

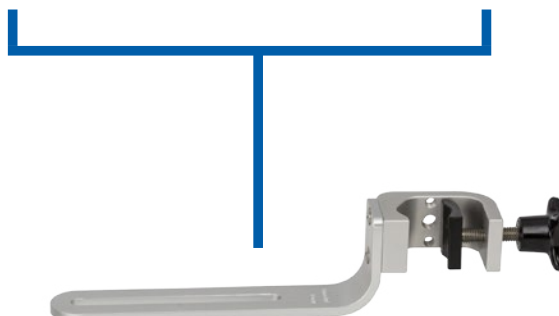
RAM-1"-ball



Ball head  
(s. Page 165)



RAM 1"-ball mount  
(s. Page 165)



Slotted hole beam  
with pole clamp  
(s. Page 165)

### INFO

The appropriate type of long-hole beam or pole clamp depends on the diameter of your pole / tripod leg. For more information [Page 165](#).



Table of  
contents



Print  
page

previous



next  
page

step  
back



step  
forward



## Beam and ball head



### Long hole beam with pole clamp

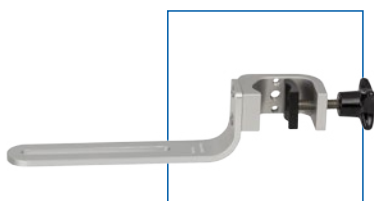
- The slotted hole beam allows an optimized installation of the computer with minimum distance to the pole, either on the side or in front of it
- With the ball head, the display can be ergonomically adjusted (inclined and rotated) with regard to the sunlight
- With the stable screw clamp, the holder can be attached to the pole. Clamps are available for different pole diameters



Ø 18 - 32 mm



Ø 32 mm



Description	Order-No.	Euro
Slotted beam with clamp for poles with Ø 18 to 32 mm	5020.18	75,-
Slotted beam with clamp for poles with Ø 30 to 45 mm	5020.45	75,-
Slotted beam with clamp for poles with Ø 32 mm	5020.F	75,-

#### 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	53,-
RAM-mount M8 with star grip screw	4800.M8S	55,-



Table of contents



Print page

previous



next page

step back



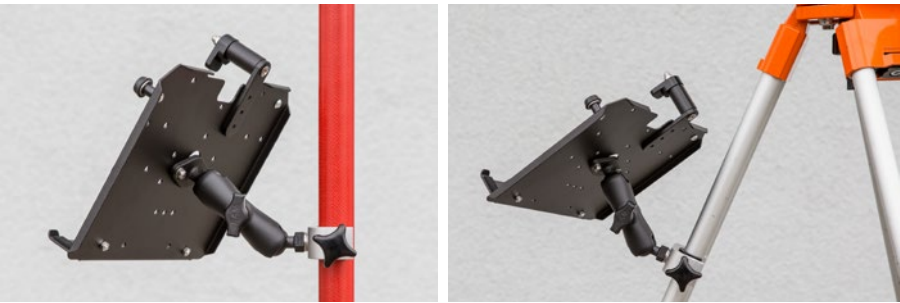
step forward





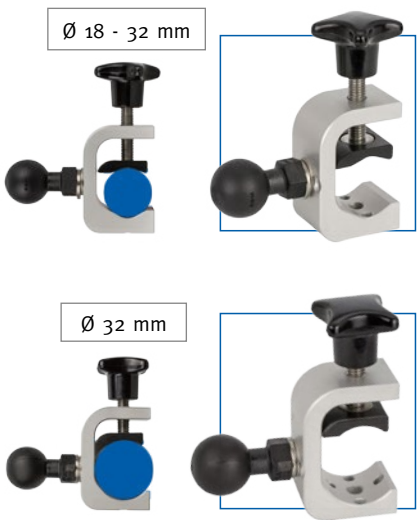
## Pole Clamp and Double Joint

For all computer holders with RAM 1"-ball



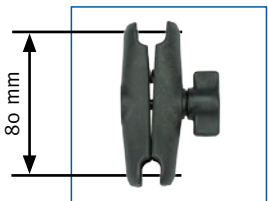
### Pole-Clamp with RAM-1"-ball

- Universal mounting of the computer in front of the pole. Lateral mounting is not possible due to the short length of the double joint
- Due to the double joint, the holder can be tilted and inclined as required. The desired position is fixed by a central screw
- The holder can be attached to the pole with the sturdy screw clamp



Description	Order-No.	Euro
Pole clamp Ø 18 bis 32 mm, with RAM 1"-ball	4810.1	75,-
Pole clamp Ø 32 mm, with RAM 1"-ball	4810.F	75,-
Pole clamp Ø 30 bis 45 mm, with RAM 1"-ball	4810.2	75,-

If only poles with Ø 32 mm are used, we recommend the clamp 4810.F to protect the pole material [see Page XXX](#).



### Double Joint Beam

Connecting piece between pole clamp and computer holder with RAM connection.

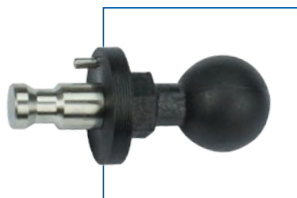
Description	Order-No.	Euro
RAM 1" double joint beam L= 80 mm	4805.08	25,-

## SECO-Claw-Clamp and Adapter



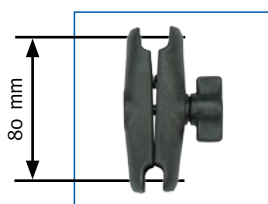
Advantages as above, but with an additional function: With the push button of the SECO connection, the holder with both RAM-1" balls and the double joint can be removed, only the SECO clamp remains on the pole.

Description	Order-No.	Euro
Claw-Clamp from SECO for poles with Ø32 mm	<b>1890.1</b>	66,-



Description	Order-No.	Euro
Adapter SECO-Clamp - RAM 1"-ball	<b>4808</b>	45,-

All commercially available SECO clamps (screw clamps and CLAW clamps) can be used.



## 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	<b>4805.08</b>	25,-

Other length please see [Page 160](#).

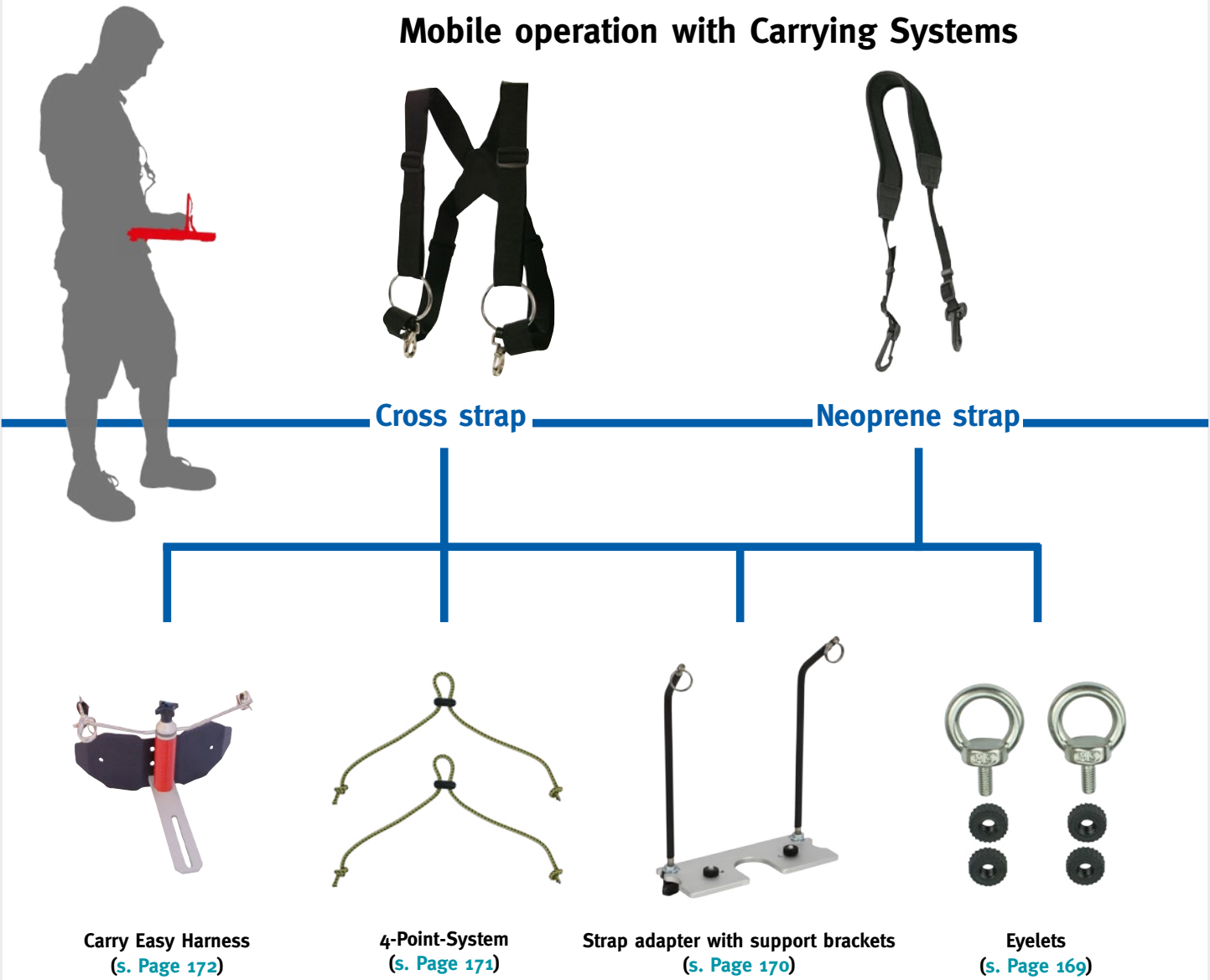

[Table of contents](#)

[Print page](#)
[previous page](#)

[next page](#)
[step back](#)

[step forward](#)

# Mobile operation with Carrying Systems



## 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 carbiners	5790	45,-

### 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 carbiners	5780	28,-



## Mobile use with ring eyelets and carrying strap

For ALOVAR holders 270, S1 and S2, as well as holder FZ-M1 and Getac T800.

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	14,-



### Neoprene Carrying Strap

Description	Order-No.	Euro
Neoprene strap with 2 plastic carabiners (s. Page 168)	5780	28,-

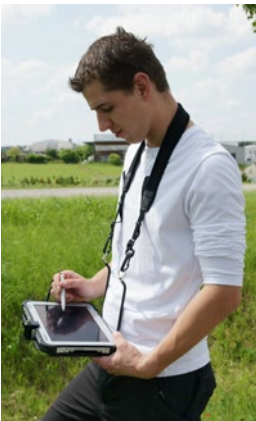
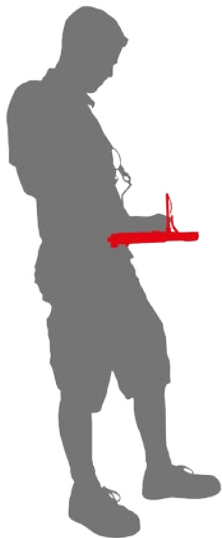




## Mobile use with strap adapter / carrying strap

For ALOVAR holder 320, as well as holder Panasonic FZ-G1, CF-20 and Getac F110.

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.



### Strap adapter with support brackets

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.

To use the holder on the pole or on a tripod, the adapter can be completely unscrewed in seconds using the retaining brackets. Alternatively only the two retaining brackets can be unscrewed and the adapter remains in place on the holder.



Description	Order-No.	Euro
Strap adapter with two brackets for <b>ALOVAR</b> -holders	<b>5238.L</b>	85,-
Strap adapter with two brackets for Panasonic <b>FZ-G1</b>	<b>5238</b>	85,-



### Cross Strap

Description	Order-No.	Euro
Cross strap, with two metal carabines ( <a href="#">s. Page 168</a> )	<b>5790</b>	45,-



### Neopren-Tragegurt

Description	Order-No.	Euro
Neoprene strap with 2 plastic carabines ( <a href="#">s. Page 168</a> )	<b>5780</b>	28,-



Example image

## Mobile use with carrying strap / 4-point system

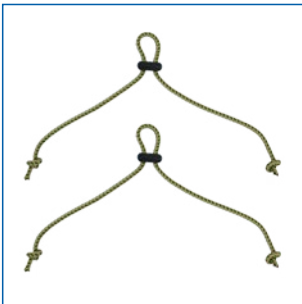
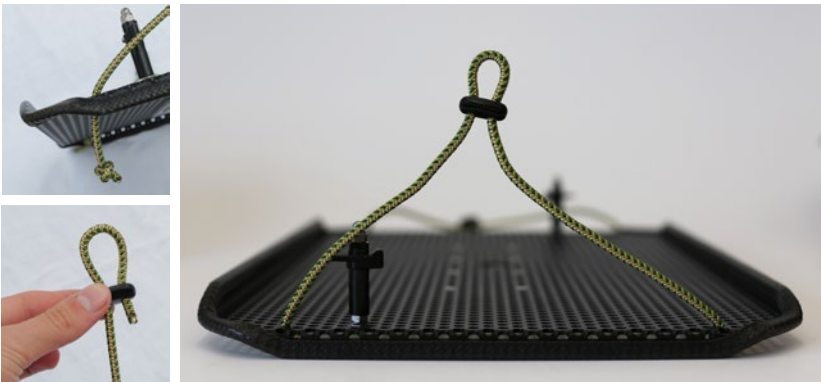
For ALOVAR holders S1, 270-420, as well as holders CF-20, F110.

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 <b>F110, CF-20, S1, 270, 320 (2 pc.)</b>	<b>5786</b>	14,-
Cord-Strap-Adapter ALOVAR <b>370, 420 (2 pc.)</b>	<b>5787</b>	14,-

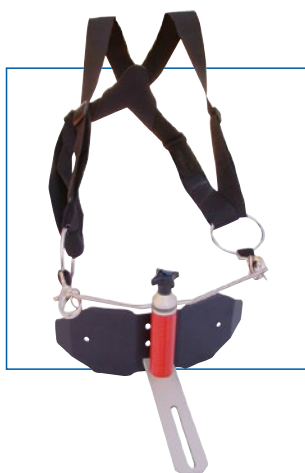
## Cross strap

Description	Order-No.	Euro
Cross strap with two metal carabiners ( <a href="#">s. page 168</a> )	<b>5790</b>	45,-

## Carrying System "Carry Easy"

### For computers from 1000 g up

In surveying, the field engineers use various computers (laptops, Tablet PC, etc.). Type, size and weight vary a lot. With the "Carry Easy" carrying system, even heavy computers can be easily and conveniently used.



The carrying holder consists of the carrying strap, a Y-bracket, a pole-piece, a hip support and a slot-rail for fixing the holder for the field computer.

- Carrying Strap: Black fabric tape processed as cross strap, with good fit and easy length adjustment. Sturdy quick-release fasteners for holding the Y-bracket
- Y-Bracket: The stainless steel bracket is axially rotatable and can be locked so that the main focus of the field computer is well balanced and can be comfortably carried.
- Pole-Piece: The composite pole piece has a diameter of 32 mm and connects the Y-bracket to the rail for the computer holders.
- Hip support: The wide, ergonomically adapted support made of powder-coated aluminium ensures a pleasant distribution of the load force over the abdominal and hip area.
- Slot rail for computer holder: The slot-hole allows the holders of the computers to be positioned for optimum operation via a ball head/ball joint.
- WEight: 820 g

Description	Order-No.	Euro
Carrying System "Carry Easy", Type S	<b>5715</b>	185,-

### ■ Application possibilities

For all computer mounts with ball head or RAM 1" ball mount with star grip screw [s. Page 165](#).

For this purpose, the computer holder is connected to the rail of the carrying holder by a ball head. The holder can be tilted with the ball head in a way that the screen of the computer can be seen optimally.

In addition, the ball head can be moved on the rail in order to obtain the most ergonomically favourable body distance for operating the computer. The position is fixed with a large star grip screw.



### For light computers up to 1000 g

For all computer mounts with clamps for poles with Ø32 mm,  
For example SECO clamps [s. page 166](#).

The pole section to which the computer holder is clamped can be swung out sideways. This allows the computer to be positioned exactly in the centre of gravity. By the adjustment possibility along the long hole one receives the most favorable body distance. A simple change of the computer holder between the application on the GNSS/prism pole and the carrying holder is possible.

Description	Order-No.	Euro
Carrying system "Carry Easy", Type L	<b>5725</b>	195,-



## 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

### INFO

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.



The computer holder can only be operated ergonomically when having the possibilities of a ball joint. The suction holder is available with 2 types of ball joints:

## With M8 ball head

For use with computer holders with M8 inner thread

- 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	185,-

## With RAM-ball mount

For use with computer mounts with rear-mounted RAM ball size B (Ø1")

- 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-mount	5827.R	185,-





## 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.

- Side mounting with knurled nut.
- Weight: 10 g (ALOVAR) / 27 g (FZ-G1)

#### ■ For all perforated plate holders of the ALOVAR series

Description	Order-No.	Euro
<b>ALOVAR</b> pen holder for pens with Ø9 mm (with knurled nut M5)	<b>5841</b>	14,-
<b>ALOVAR</b> pen holder for pens with Ø12 mm (with knurled nut M5)	<b>5841.12</b>	14,-
<b>ALOVAR</b> pen holder for pens with Ø13 mm (with knurled nut M5)	<b>5841.13</b>	14,-

#### ■ For special holder FZ-G1

Description	Order-No.	Euro
<b>FZ-G1</b> pen holder for pens with Ø9 mm (with knurled nut M5)	<b>5840</b>	20,-
<b>FZ-G1</b> pen holder for pens with Ø12 mm (with knurled nut M5)	<b>5840.12</b>	20,-
<b>FZ-G1</b> pen holder for pens with Ø13 mm (with knurled nut M5)	<b>5840.13</b>	20,-

### 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)	<b>5890</b>	50,-

### 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	<b>5868</b>	3,50


[Table of contents](#)

[Print page](#)
[previous page](#)

[next page](#)
[step back](#)

[step forward](#)

# Laserscanning / Tachymetry / Georeferencing

■ Page 1 of 1

## I.1 Laserscanning Sphere

page 176



## I.2 Circular Laserscanning Targets

page 178



## Laserscanning 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.

### Model 1: Standard

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

### Model 2: Flex

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

## Set of 6 in transport case

Sturdy plastic case (575 x 470 x 250 mm)



Description	Order-No.	Euro
Set of 6 spheres <b>Standard</b> , Ø 145 mm, M8 inner thread	<b>6053</b>	569,-
Set of 6 spheres <b>Flex</b> , Ø 145 mm, M8 inner thread	<b>6054</b>	719,-



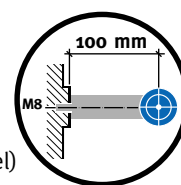
## Single Scanning Sphere

Description	Order-No.	Euro
Sphere <b>Standard</b> , Ø 145 mm, M8 inner thread	<b>6000</b>	89,-
Sphere <b>Flex</b> , Ø 145 mm, M8 inner thread	<b>6002</b>	114,-



## Adapter: Offset 100 mm

- Aluminium hexagon with 2 x M8 outer thread (stainless steel)
- Effective length (without M8 threads) = 27,5 mm



Description	Order-No.	Euro
Adapter 2 x M8 for scanning sphere Ø 145 mm	<b>6005</b>	15,-



## Application Examples



Laserscanning Sphere Ø 145 mm  
see previous page 176



Adapter M8, Length: 50 mm  
Art.-No. 0374.050 • 24,50 €



O-Ring-pole clamp, M8  
Art.-No. 2311.M8 • 30,- €



Adapter 5/8" - M8  
Art.-No. 0384.77 • 25,- €



Magnetic base, M8  
Art.-No. 5930 • 35,- €  
page 91



Suction holder, M8  
Art.-No. 5936 • 46,- €  
page 92  
Suction holder, M8,  
with vacuum indicator  
Art.-No. 5938 • 76,- €  
page 92



Triangle base plate, M8  
Art.-No. 6114.M8I • 49,- €

on magnetic surfaces



on smooth surfaces



on the ground



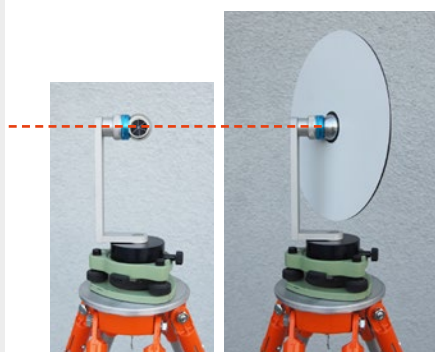
on Prism-/Ranging pole



on Prism-/GNSS-pole







## Circular Target with centric ball connection

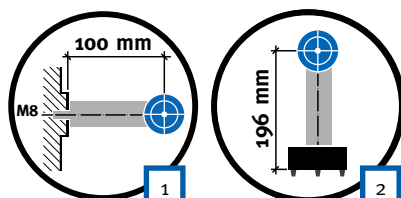
For registration and georeferencing in terrestrial laser scanning

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.

Zum optimalen Ausrichten auf den Standpunkt kann die Zielmarke in jede Richtung gekippt werden, ohne Veränderung der 3D-Koordinaten des Zielzentrums.

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 Target with checkerboard design

- Torsionally rigid aluminum composite plate Ø 270 mm
- Weatherproof
- Temperature for use and storage: -10° to 50°
- To use with magnetic ball base
- Centric hemisphere Ø 1.5" (38,1 mm), galvanized
- Tilting range: ± 35°



### Description

circular target Ø 270 mm, checkerboard design, hemisphere Ø 1.5" in target center

### Order-No.

6155

### Euro

119,-

## Ball base Ø 1.5" with M8 outer thread

For alternative use of ball prism and circular target

- Magnetic holding force towards hemisphere: around. 6 kg
- Offset of ball center from back of base (without M8 thread) = 50 mm



### Description

magnetic base, M8 outer thread, holding force 6 kg (page 61)

### Order-No.

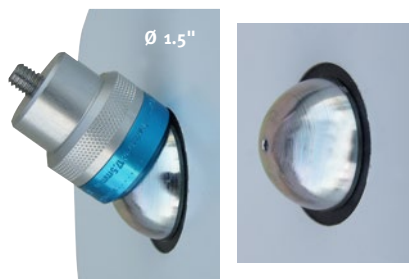
1466.08a

### Euro

49,50

### 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

- Screw directly into the M8 internal thread of the wall bolt
- Offset 50 mm from wall bolt to ball / target center

Wall bolts [see page 83](#)



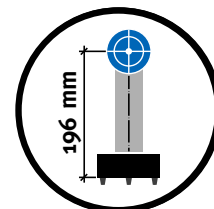
## Circular targets with L-brackets

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.

- M8 inner thread to screw-in the ball base (see page 61)
- Stable and precise construction made of anodised aluminum

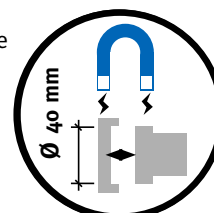
5/8" inner thread to screw onto tribrach inserts or prism poles.



Description	Order-No.	Euro
L-bracket, 5/8" inner thread for tribrachs for ball bases	<b>6170</b>	80,-

## Usage with 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  $\pm 0,1$  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-bracket with magnetic base  $\varnothing 40$  mm, magnetic holding force: ca. 5 kg.

- Stable and precise construction made of anodised aluminum
- M8 inner thread to screw in the ball base (see page 61)

Description	Order-No.	Euro
L-bracket, <b>magnetic base <math>\varnothing 40</math> mm</b> , with M8 inner thread	<b>6160.M40</b>	90,-

## Quick-change adapter: 5/8" inner thread – $\varnothing 40$ mm

- Adapter to screw-in / out, with forced centering
- Bottom: 5/8" inner thread
- Top: centering for magnetic base  $\varnothing 40$  mm
- Centering accuracy  $\pm 0,1$  mm
- Galvanized steel, magentic
- Effective length: 20,5 mm

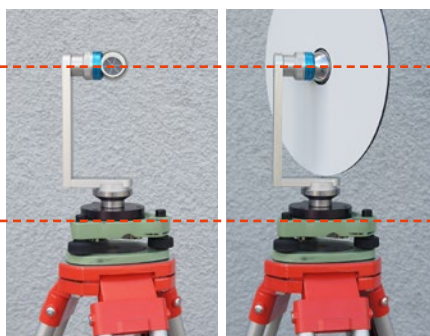
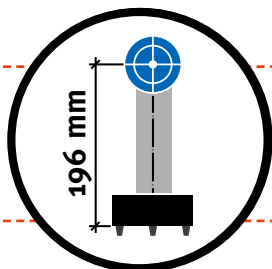
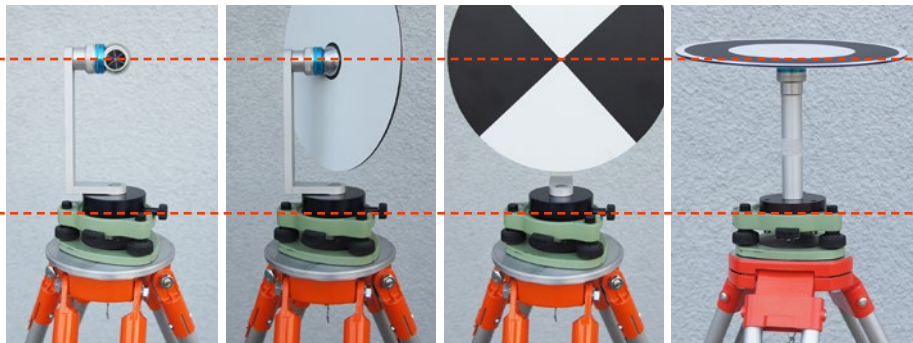
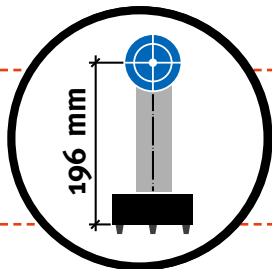
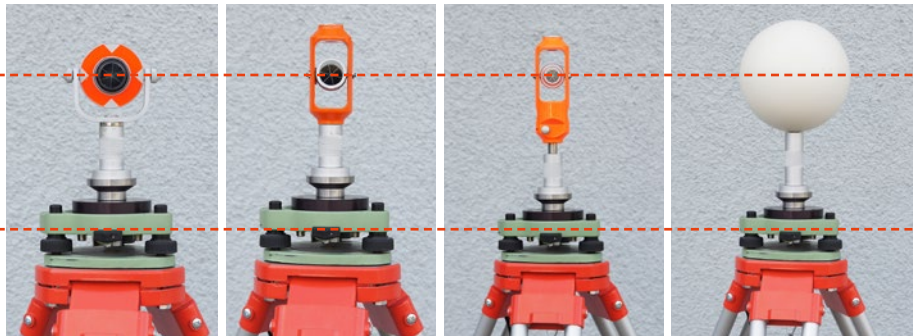
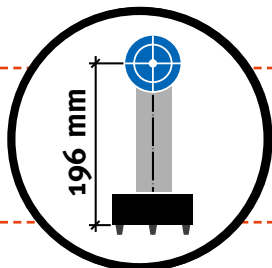
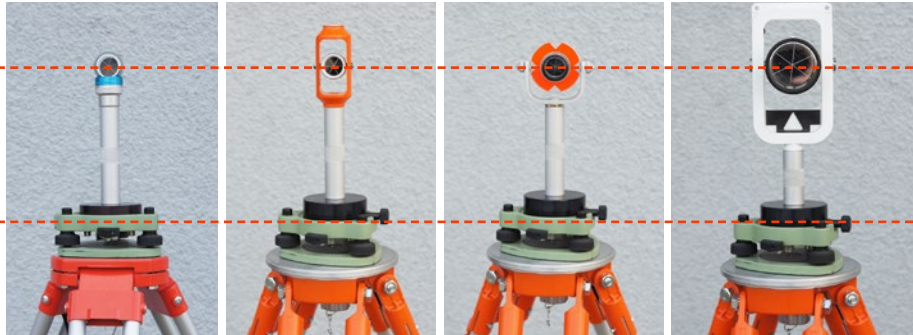
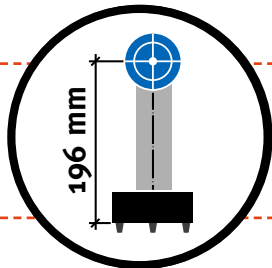
Description	Order-No.	Euro
Centering adapter 5/8" – $\varnothing 40$ mm	<b>6162.40</b>	26,-

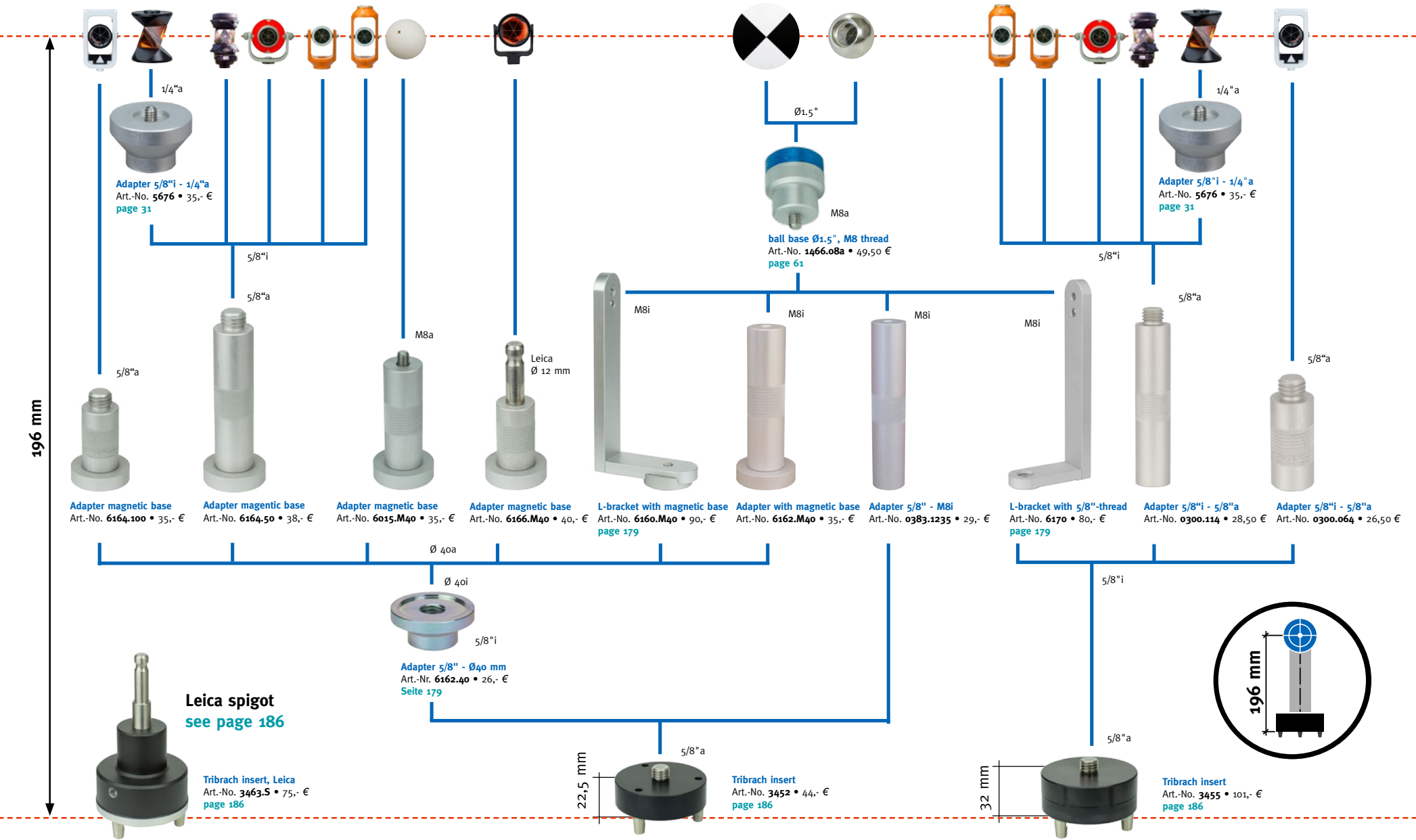
## Tilting Axis Height 196 mm

### 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 the [next page](#).







# General Surveying Accessories

## ■ Page 1 of 1

### J.1 Instrument Tripod, Tripod Star, Tribrach, Desk Holder

page 183



### J.2 Prism/GNSS-poles, Ranging Rod Tripod & Pole Accessories

page 190



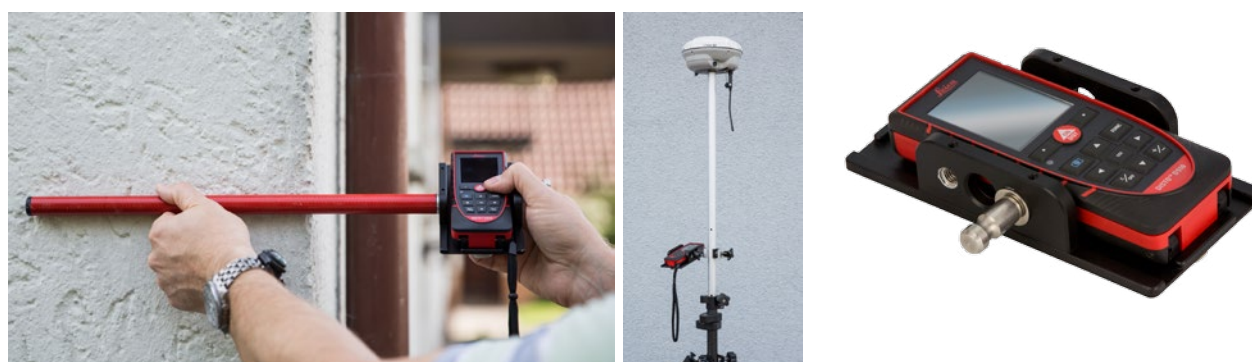
### J.3 Magnet-/Suction holder for GNSS antennas

page 191



### J.4 Holder for Laser Distance Meters (DISTOS)

page 196





## Instrument Tripod

- With turned ledge on the tripod head for mounting our rotating computer holder Uni 168 s. [page 162](#)
- Length when pushed together: 1,12 m
- Weight: 6,7 kg

Description	Material	Clamping	Order-No.	Euro
NEDO Tripod	Alu	eccentric clamping	<b>200524P</b>	164,-

### 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	<b>1975</b>	68,-

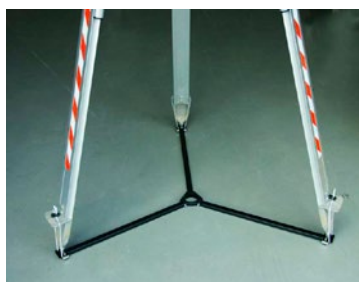
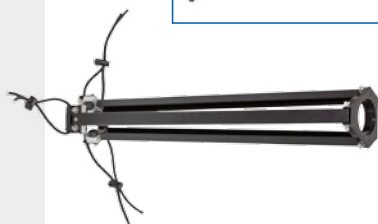


Table of contents



Print page

previous



next

step back



step forward



## 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)	<b>1973</b>	42,-

### INFO

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



Universal Transport Case  
s. next page 185



Table of  
contents



Print  
page

previous



next  
page

step  
back



step  
forward

## Universal Transport Case

For the safe transport of various surveying accessories.

- Outer dimensions: Approx. 275 x 230 x 80 mm
- Weight: 420 g
- Made of red plastic
- 2 Click fasteners
- Available with three different bubble foam thicknesses



Description	Bubble Foam	Order-No.	Euro
Universal Transport Case	dünn (25 mm)	1468.1	28,-
	mittel (30 mm)	1468.2	28,-
	dick (40 mm)	1468.3	28,-

INFO

A bubble foam insert is glued to the top and bottom of the case. The glued-in inserts are available in three different thicknesses (see table). The choice depends on the contents to be transported.





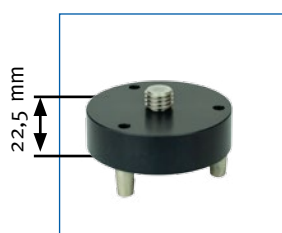
## Tribrach with Claw System

### Tribrach

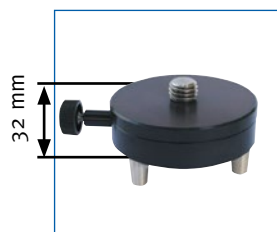


Description	Order-No.	Euro
Tribrach, claw system, black, without optical plummet	<b>3366.S</b>	140,-

### Tribrach-Inserts



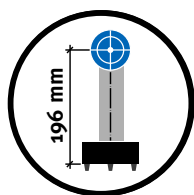
Description	Order-No.	Euro
Tribrach-insert, 5/8" outer thread, not turnable, H = 22,5 mm	<b>3452</b>	44,-



Description	Order-No.	Euro
Tribrach-insert, 5/8" outer thread, turnable, H = 32 mm	<b>3455</b>	101,-



Description	Order-No.	Euro
Tribrach-insert, Leica stud bolt	<b>3463.S</b>	75,-



#### INFO

Adapter to reach the target / tilting axis height of 196 mm  
s. next page 187



Table of  
contents



Print  
page

previous

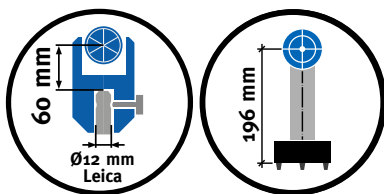


next  
page

step  
back



step  
forward



## Adapter for Tribrach claw inserts

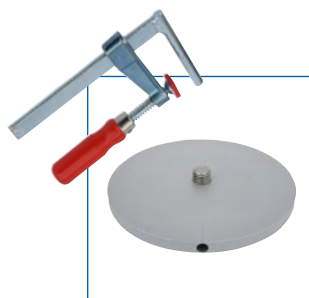
- To reach target / tilting axis height: 196 mm
- Made of anodized aluminium and stainless steel
- See also adapter table on the next page



Description	bottom	top	effective length	Order-No.	Euro
Adapter 5/8"- Leica for tribrach inserts H = 32 mm	5/8" inner thread	Leica stud bolt Ø 12 x 40 mm	104 mm	<b>0366.104</b>	34,-
Adapter 5/8"- Leica for tribrach inserts H = 22,5 mm			113,5 mm	<b>0366.1135</b>	34,-

## 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 scw clamp	<b>3350</b>	75,-



# Adapters for Tribrach Claw Inserters

To reach target / tilting axis height: 196 mm

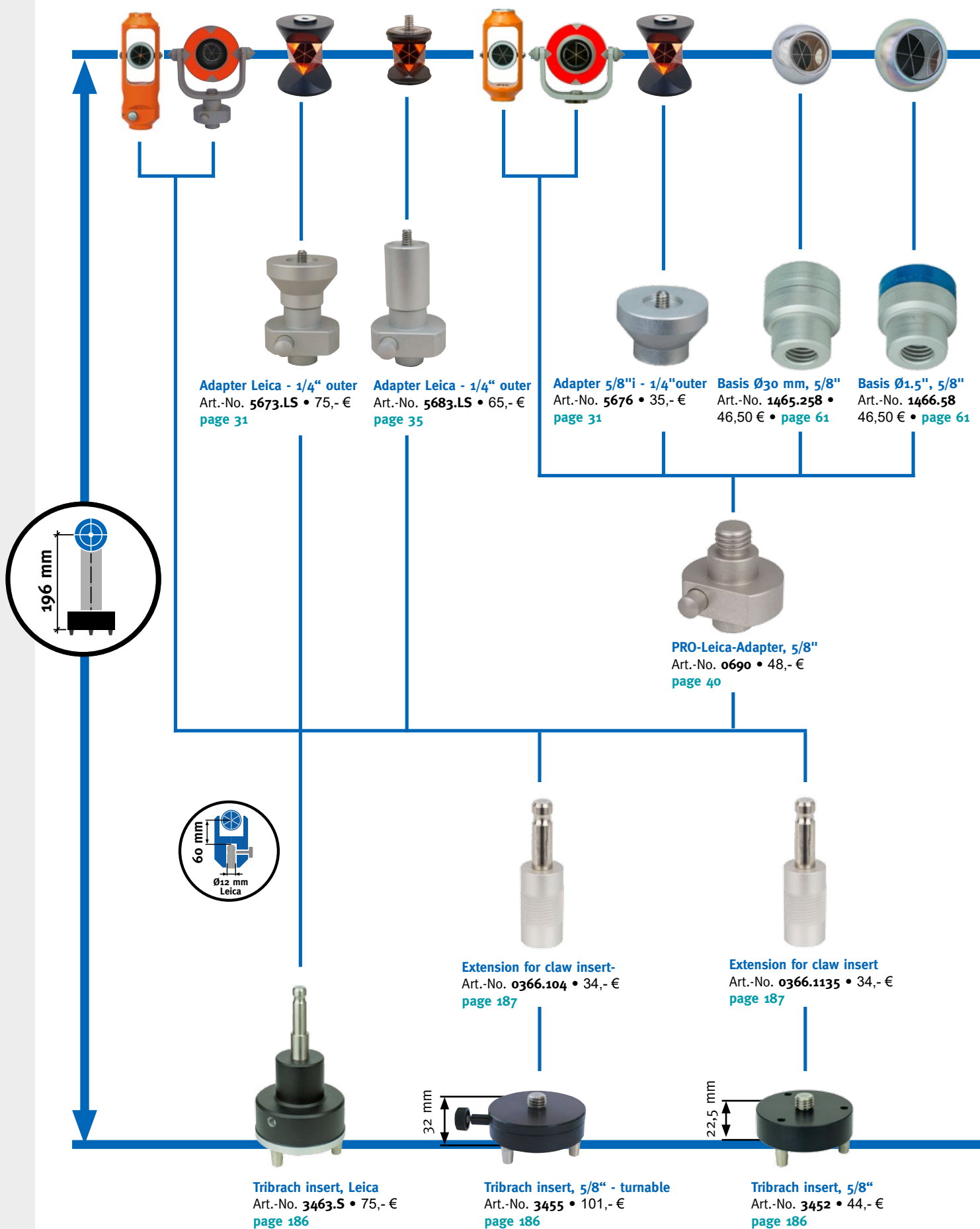


Table of contents



Print page

previous page

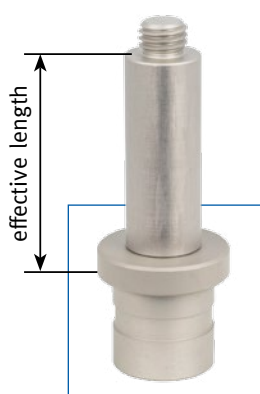
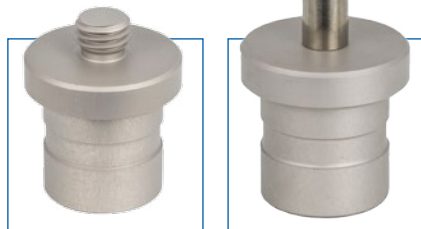
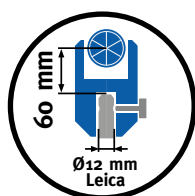


next page

step back



step forward



## 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	<b>0360</b>	29,-
		5/8" outer thread	10 mm	<b>0340</b>	22,-
		Leica spigot Ø 12 x 40 mm	50 mm	<b>0367.40</b>	36,-

### INFO

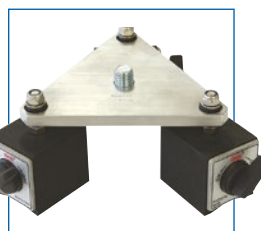
Other top connections are available on request. For example: 1/4", 3/8", Leica spigot Ø12 x 27 mm, etc.

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	<b>0305.58</b>	34,-
			75 mm	<b>0305.75</b>	36,-
			108 mm	<b>0305.108</b>	40,-
			125 mm	<b>0305.125</b>	42,-

### INFO

Other lengths are available on request.





## Holder for Antenna and Prisms

### ■ Magnet Holder 5/8"

- Triangular stable aluminium base plate
- Movable feet for adaptation to slightly curved surfaces
- Adjustable M8 threads to adapt the magnets
- Distance between feet axes: 135 mm
- With 5/8" outer thread
- For all magnetic surfaces

For scratch-sensitive surfaces, we recommend using a plastic foil under the magnets.

With 3 switchable magnets, dimensions approx.: 60 x 50 mm

Description	Order-No.	Euro
Magnet-Holder 5/8"-outer thread, 3 switchable magnets	<b>6116</b>	165,-

### INFO

Due to the low metal sheet thickness of car roofs, the magnetic holders are only conditionally suitable.



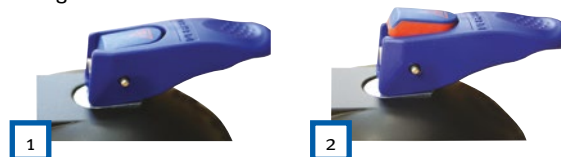
### ■ Suction holder 5/8"

For surfaces with gas-tight surfaces such as glass, plastic, metal, marble, etc.

- Suction surface: Ø 120 mm
- Holding force (suction) of one cup: 15 kg
- The suction cups relaxed rubber surface must be pressed firmly onto the surface. When the rocker arm is turned over, the resistance of the negative pressure generation must be clearly noticeable

Description	Order-No.	Euro
Suction Holder, 5/8" outside thread	<b>6120</b>	185,-
Suction Holder, 5/8" outside thread, <b>with vacuum indicator</b>	<b>6126</b>	290,-

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



## Adapter: 5/8" to Leica spigot

Bottom: 5/8" inside thread, Top: Leica spigot

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



Description	length Leica spigot Ø 12 mm	effective length	Order-No.	Euro
Adapter 5/8"-Leica	27 mm	47 mm	<b>0377.27</b>	29,-
	40 mm	60 mm	<b>0377.40</b>	31,-

## 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

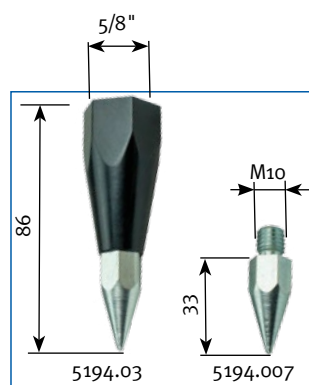
Description	Order-No.	Euro
Prism pole S_10 with eccentric lever, 1,33 – 2,20 m	<b>5612</b>	240,-

#### 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	<b>5194.03</b>	15,-
Tip for prism pole, only steel base part	<b>5194.007</b>	4,50


[Table of contents](#)

[Print page](#)
[previous page](#)

[next page](#)
[step back](#)

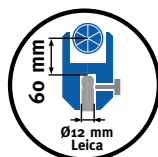
[step forward](#)

## 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	<b>0297.100</b>	29,-

##### ■ 5/8" inside thread and 100 mm tilting axis heights

z.B. prism KTR1 and Kompatible

Description	Order-No.	Euro
Extension 2 x 5/8" outside thread, effective length 50 mm	<b>0297.50</b>	27,-

##### ■ 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	<b>0378.90</b>	29,-

### 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
26 mm	5/8“ inside thread	5/8“ outside thread	0,5 m	300 g	<b>5503.2</b>	60,—
			1,0 m		<b>5503</b>	80,—
32 mm			0,5 m	350 g	<b>5455.2</b>	80,—
			1,0 m		<b>5455</b>	100,—

Leica Extensions						
Ø	bottom	top	length	weight	Order-No.	Euro
26 mm	Leica socket	Leica spigot, 40 mm	0,5 m	350 g	<b>5503.2L</b>	85,-
			1,0 m		<b>5503.L</b>	105,-
32 mm			0,5 m	400 g	<b>5455.2L</b>	105,-
			1,0 m		<b>5455.L</b>	125,-

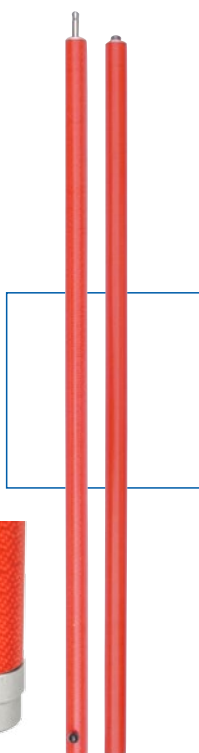


Table of contents



Print page

previous



next page

step back



step forward

## Strut Tripods / Bipods

For quick and easy installation of prism poles in any terrain.

### ■ Bipod (Seco)

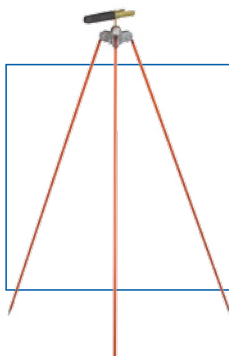
- Top pushbutton clamp
- Adjustable range of legs: 1,05 – 1,80 m
- Open clamp for lateral insertion of the poles
- Suitable for poles with Ø : 25 – 38 mm



Description	Order-No.	Euro
Strut bipods, 2 legs, Alu, red, 1,8 kg	<b>2091.R</b>	150,–

**ON  
REQUEST**

Other bipods and tripods available on request.



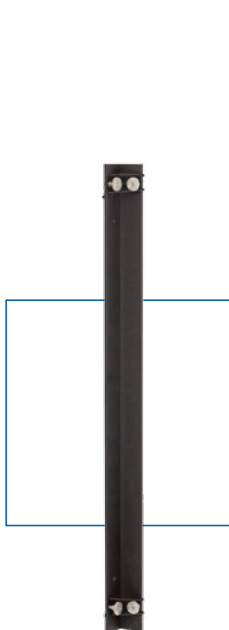
## Ranging Pole Tripod

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	<b>2090</b>	21,–

## Pole adjustment base

- Ideal for regular control or adjustment of the circular level on prism rods
- Sturdy construction made of black powder-coated aluminium
- For mounting on walls
- Vertical alignment of the contact surfaces via knurled set screws. Unique, simple adjustment by means of cord solder or spirit level
- Secure pressure of the prism pole to the adjustment base due to high-quality retaining rubbers with handle flaps
- For prism poles from 0,80 m length and Ø 25-50 mm
- Incl. mounting material (screws, dowels, etc.)
- Dimensions: 50 x 50 x 850 mm, Weight: 1,5 kg



Description	Order-No.	Euro
Pole Adjustment Base JB	<b>2260</b>	145,–



Detail



## 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	<b>5475</b>	17,-
Compass with Velcro fastener, for poles Ø 40 mm	<b>5476</b>	20,-

Description	Order-No.	Euro
Compass (single) as spare part, with adhesive foil	<b>5475-E</b>	3,-

Replacing a defective compass (single):



## Compass in Aluminim-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	<b>3008.K</b>	36,-

For other poles with Ø 20 to 32 mm we supply a **reduction shell** made of plastic. It ensures a firm fit of the compass holder and protects the pole surface.

Description	Order-No.	Euro
Holder with compass and reduction shell ( <b>see note</b> )	<b>3008.KR</b>	39,50

### INFO

Please indicate the exact diameter of the pole.

## 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	<b>5425</b>	20,-



Table of contents



Print page

previous



next page

step back



step forward



## 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	<b>3008.10</b>	49,-
Holder with circular level 30', for poles with Ø 32 mm	<b>3008.30</b>	46,-

For other poles with **Ø 20 to 32 mm** we supply a **reduction shell** made of plastic. It ensures a firm fit of the compass holder and protects the pole surface.

Description	Order-No.	Euro
Holder with circular level 10' and reduction shell	<b>3008.10R</b>	52,50
Holder with circular level 30' and reduction shell	<b>3008.30R</b>	49,50

### INFO

Please indicate the exact diameter of the pole.



## ■ Second Level

If only one circular level is used on the pole, its adjustment should be checked daily. To increase the reliability of the measurement, we therefore recommend the use of a second level for high accuracy applications. It is screwed to the pole independently of the 1st level. After careful adjustment of both vials, the correct vertical position of the pole is ensured, if both levels are being used simultaneously. The two levels virtually control each other.

**Only when the levels no longer correspond, an adjustment is obligatory.**



Table of contents



Print page

previous

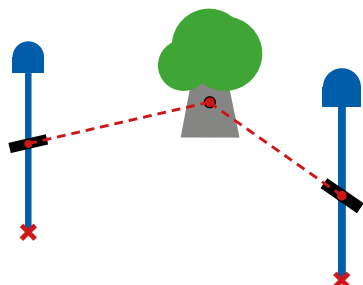


next

step back



step forward



## 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 198](#)
- Weight: 240 g



Description	Order-No.	Euro
Holder <b>KiLas-Geo</b> (without laser distance meter)	<b>2800</b>	135,-

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



### 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	<b>2808</b>	8,-



Table of contents



Print page

previous



next page

step back



step forward



### 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	85,-



### 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	45,-





## Pole to extend building lines



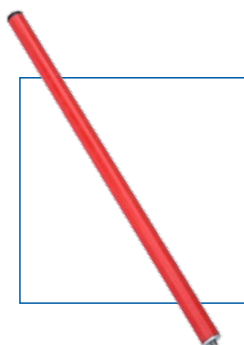
A 40 cm long pole is screwed into the KiLas-Geo (possible on both sides). By placing the pole against the building wall, the building alignment is constructively extended so that it runs through the defined reference point of the distance measurement; even when the support is tilted.

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

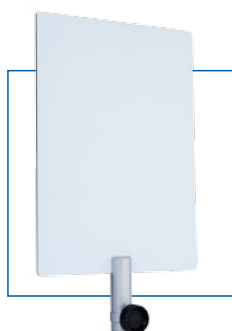


Description	Order-No.	Euro
Extension pole for KiLas-Geo, Ø 20 x 400 mm (GFK/CFK, red)	<b>2806</b>	42,-

## 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, <b>5/8" internal thread</b>	<b>6062</b>	48,-
Target-Plate LA4, white, 21 x 30 cm, <b>Leica socket Ø12 mm</b>	<b>6064</b>	53,-


[Table of contents](#)

[Print page](#)
[previous page](#)

[next page](#)
[step back](#)

[step forward](#)



## Adapter

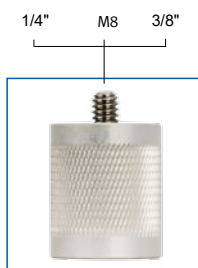
Made of stainless steel with cross knurl

Description	bottom	top	Effective length	Order-No.	Euro
Adapter M8 - 5/8"	M8 inner	5/8" outer	7 mm	<b>0385</b>	17,-



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	<b>0372.050</b>	22,50
		M8 outer	50 mm	<b>0373.050</b>	23,50



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	<b>0383</b>	24,50
		1/4" outer	30 mm	<b>0390</b>	22,-
		3/8" outer	30 mm	<b>0382</b>	24,50



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	<b>0300.030</b>	26,50
			50 mm	<b>0300.050</b>	26,50
			64 mm	<b>0300.064</b>	26,50
			65 mm	<b>0300.065</b>	26,50
			75 mm	<b>0300.075</b>	26,50
			86 mm	<b>0300.086</b>	28,50
			100 mm	<b>0300.100</b>	28,50
			114 mm	<b>0300.114</b>	28,50
			115 mm	<b>0300.115</b>	28,50
			136 mm	<b>0300.136</b>	28,50
			150 mm	<b>0300.150</b>	28,50
			175 mm	<b>0300.175</b>	28,50
			200 mm	<b>0300.200</b>	28,50

Other lengths are available as special designs under the number 0300.L (s. page 201).



Tablet of  
contents



Print  
page

previous  
page



next  
page

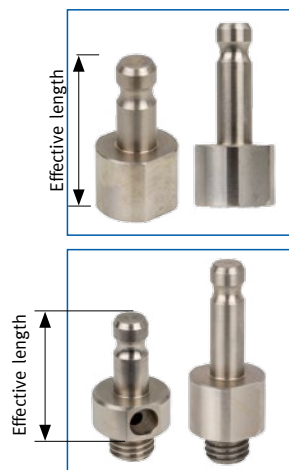
step  
back



step  
forward



Description	bottom	top	Effective length	Order-No.	Euro
Adapter M8 - Leica	M8 inner	Leica spigot Ø 12 x 27 mm	27 mm	<b>0180.25</b>	12,-
		Leica spigot Ø 12 x 40 mm	40 mm	<b>0180.30</b>	14,-

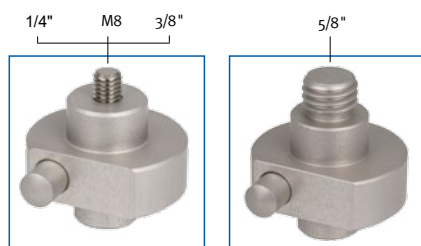


Aus Edelstahl

Description	bottom	top	Effective length	Order-No.	Euro
Adapter 5/8" - Leica	5/8" inner	Leica spigot Ø 12 x 27 mm	47 mm	<b>0377.27</b>	29,-
		Leica spigot Ø 12 x 40 mm	60 mm	<b>0377.40</b>	31,-
	5/8" outer	Leica spigot Ø 12 x 27 mm	40 mm	<b>0378.27</b>	29,-
		Leica spigot Ø 12 x 40 mm	60 mm	<b>0378.40</b>	31,-

### ■ Adapter from Leica spigot to threads

- 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	<b>0680</b>	48,-
		1/4" outer	10 mm	<b>0692</b>	48,-
		3/8" outer	10 mm	<b>0693</b>	48,-
		5/8" outer	10 mm	<b>0690</b>	48,-

- 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	<b>0302.10</b>	28,-
	Leica socket Ø 12 x 26 mm	5/8" outer	10 mm	<b>0291.10</b>	28,-
	Leica socket Ø 12 x 40 mm		10 mm	<b>0306.10</b>	29,-



Tablet of  
contents



Print  
page

previous  
page



next  
page

step  
back



step  
forward

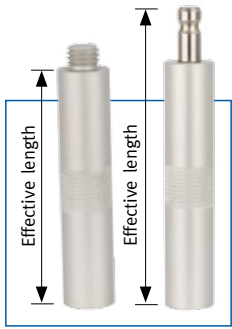
Customs extensions 5/8" and Leica

■ 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



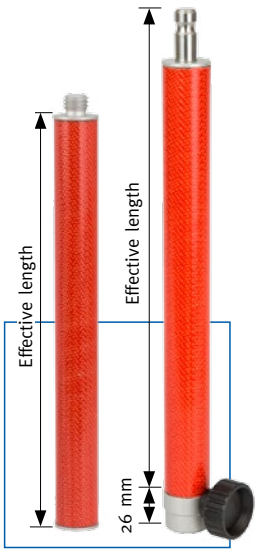
Description	bottom	top	Order-No.	Euro
Extension Ø 25 mm	5/8" inner-thread	5/8" inner thread	<b>0295.L</b>	29,-
		5/8" outer thread	<b>0300.L</b>	32,-
		Leica spigot Ø 12 x 27 mm	<b>0377.L</b>	37,-
	5/8" outer-thread	5/8" outer thread	<b>0297.L</b>	34,-
		Leica spigot Ø 12 x 27 mm	<b>0376.L</b>	39,-
	Leica socket Ø 12 x 26 mm	5/8" inner thread	<b>0290.L</b>	34,-
		5/8" outer thread	<b>0291.L</b>	36,-
		Leica spigot Ø 12 x 27 mm	<b>0304.L</b>	41,-

■ 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	<b>5630.L</b>	82,-
		5/8" outer thread	<b>5631.L</b>	85,-
		Leica spigot Ø 12 x 27 mm	<b>5632.L</b>	90,-
	5/8" outer-thread	5/8" outer thread	<b>5633.L</b>	85,-
		Leica spigot Ø 12 x 27 mm	<b>5634.L</b>	93,-
	Leica socket Ø 12 x 26 mm	5/8" inner thread	<b>5635.L</b>	107,-
		5/8" outer thread	<b>5636.L</b>	110,-
		Leica spigot Ø 12 x 27 mm	<b>5637.L</b>	115,-

Length 0,5 m [see page 192](#)





**Order Form –**

Tel. +49 (0) 7143 / 89 10 03

Fax +49 (0) 7143 / 9 40 32

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
<b>Total:</b>				

**Delivery**

Instant <input type="checkbox"/>	Date
Notes:	

Orders are placed on the basis of the general terms and conditions of the Bohnenstingl GmbH  
(16.10.2018)

Location

Date

Signature


Tablet of  
contents

Print  
page

previous  
page

next  
page

step  
back

step  
forward

## Terms of sale, delivery and payment for end customers

For all deliveries and services, as well as repairs and service work, our general terms and conditions apply exclusively. Differing purchase conditions of the customer do not bind us, even if we do not expressly contradict them. We will only accept the customer's terms and conditions of purchase if we have agreed to them in writing.

### Liability of prices

All prices in catalogues, brochures and offers are subject to change without notice. They only become binding with our order confirmation. All prices are net prices in € (EURO) and apply exclusively in connection with our delivery conditions ex works Kirchheim. Packaging costs will not be charged. If no fixed prices have been agreed, our current price lists shall apply. We expressly reserve the right to change prices due to considerably increased material or purchasing costs.

### Terms of payment

Unless other terms of payment have been agreed, our invoices are payable net without deduction within 30 days of the invoice date and with 2% discount within 10 days. After the agreed payment periods have been exceeded, we reserve the right to charge you with the costs incurred (interest on arrears, collection fees, court costs). We retain title to all delivered goods until full payment has been made. This also applies to the extended retention of title. If the buyer is in default of payment, any right to the delivered goods expires. Custom-made products or services are not discountable.

### Discount System

We grant the following order value-dependent quantity discount on all articles listed in the catalogue on the list prices valid at the time:

From 1000,- € net value 5 % discount \*,  
from 1500,- € net value 7,5 % discount,  
from 2000,- € net value 10 % discount

\*) Except products which already have a unit worth of 1.000 € or more per piece.

### Delivery times / order confirmations

The delivery usually takes place within one week. We confirm longer delivery periods. Partial deliveries are made by arrangement.

### Retention of ownership

The goods delivered by us remain the property of Bohnenstingl GmbH until full payment of all claims. The buyer agrees with his order to insure the goods delivered under retention of title against usual risks. The purchaser is entitled to process or resell the goods delivered by us. In both cases, the extended retention of title shall be deemed accepted upon ordering the goods.

### Delay in payment

For all deliveries from us only our terms of payment apply. If the customer is in default of payment, we shall be entitled to charge default interest in the amount of eight percentage points above the base rate in addition to reminder fees in the usual amount. We expressly reserve the right to claim further verifiable damages caused by default. If the customer is in delay with more than 10 % of the total claim outstanding with us, we can make all claims due immediately.

### Delay in delivery

The delivery times stated by us may be reasonably exceeded for operational reasons. We will inform you immediately of any delays. We cannot be held responsible for delays in delivery which are not caused by us or which are due to force majeure.

### Return of goods

Returns of goods delivered by us require our explicit consent and are made by a collection arranged by us. We shall bear the costs for returns if the return delivery is due to defective goods. In all other cases, the costs of the return delivery shall be paid by the customer. Custom-made products will not be taken back.

### Drawings and descriptions of the products

The dimensions and descriptions stated in our catalogues and brochures or other documents are only approximately binding. We expressly reserve the right to make changes and technical improvements. Illustrations are completed for a better understanding of the scope of delivery.

### Freight charges

Shipments are delivered with a parcel service commissioned by us. Other delivery after arrangement. The freight costs incurred by us are presented by us and charged with the goods. From 500,- Euro the delivery within Germany is free of charge. The transport risk is transferred to the customer when leaving our factory.

### Notice of defects

Obvious defects must be reported to us immediately, at the latest within one week of receipt of the goods, in writing and with an exact description of the complaint. The customer is obliged to check the goods for defects immediately after acceptance. Later complaints can only be considered if the defects were not apparent upon arrival of the goods.

### Transport damages

Obvious transport damage must be reported to the parcel service immediately. Subsequent complaints about transport damage will generally not be accepted by the parcel services.

### Place of Jurisdiction / Place of Performance

Place of performance is Kirchheim, place of jurisdiction is Besigheim or Heilbronn, only German procedural law applies.

Stand 16.10.2018

