

Prism constants

In the current generation of total stations one must distinguish between two definitions of the prism constant (offset).

The manufacturers **Nikon, Pentax, Sokkia, Topcon and Trimble** (formerly Geodimeter, Spectra Precision, Zeiss) now all define the prism constant as an correction, that is, as a correction of the measured distance based on the physical and design characteristics of the prism or reflector in the instrument. In the case of triple prisms these factors are the type and length of the glass body and the mechanical mounting of the prism on the holder. The magnitude of the prism constant is determined by the distance between the vertical axis of the prism holder (target point) and the theoretical turning point S_0 of the measuring beam, which is behind the glass. If the vertical axis is situated right at point S_0 (as in the former Geodimeter prisms; see vertical axis 1 in the diagram), then the prism constant equals 0. In other commercially available prisms (except for some prism rings) the vertical axis is always in front of the turning point S_0 . The measured distance will then be too long and the corresponding correction (prism constant K) will be negative. If the vertical axis runs through the centre of the prism (vertical axis 2 in the drawing), also called the centre of symmetry, the prism has the best mounting from the point of view of error correction. In this case, inaccurate prism alignment in the total station will have a minimal effect on measurements of angles and distances.

Leica is the only company that uses a different definition. Leica's prism constant is defined with reference to its standard round prism (GPH1 + GPR1). Following the above method of calculation, this prism has a true prism constant (correction) of

-34.4 mm. In Leica's system this prism has a constant of 0.0 mm by definition.

Thus if non-Leica prisms are to be used with Leica systems or if Leica prisms are to be used with non-Leica systems, the following conversion methods must be applied:

If a non-Leica prism with a given true prism constant is to be used with a Leica total station, 34.4 mm must be added to the value.

Example of a non-Leica prism with a true constant of $K = -30$ mm:

$-30.0 \text{ mm} + 34.4 \text{ mm} = +4.4 \text{ mm}$. This is the adjustment that must be made on the Leica total station.

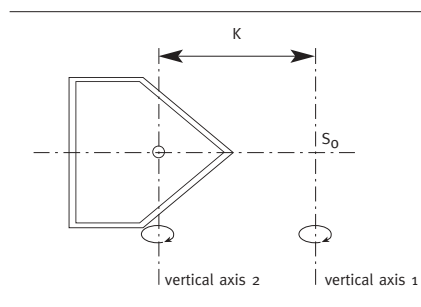
If, on the other hand, a Leica prism with a Leica system constant is to be used with a non-Leica total station, 34.4 mm must be subtracted.

Example for the Leica 360° prism GRZ121 with a Leica constant of +23.1 mm:

$+23.1 \text{ mm} - 34.4 \text{ mm} = -11.3 \text{ mm}$. This is the adjustment (rounded off, if necessary) that must be made on the non-Leica total station.

The following table takes these considerations into account, showing the constants of the most common commercially available prisms and reflectors for non-Leica systems and for the Leica system. In modern total stations, these constants can be entered directly and called up via hotkeys. Measured distances are thus corrected automatically.

To avoid having to change the settings for constants in the total station when a prism is changed, one should use standard prisms or prisms of other manufacturers with identical constants.



Prism/reflector type	Prism constant K in mm	
	definition/system Nikon, Pentax, Sokkia, Topcon, Trimble (Geodimeter, Spectra Precision, Zeiss)	definition/system Leica
Trimble prism ring for RMT 604/606	+2	+36,4
reflecting foil,		
Prism from Nikon, Topcon, Spectra Precision (Geodimeter)	0	+34,4
Bohnenstingl TOP and ONRT (s.p. 10+11)		
Bohnenstingl Prism and foil on L-holders (s.p. 8+9)		
Trimble (Zeiss) 360°-Prism	-3	+31,4
Leica 360° Mini GRZ101	-4,4	+30
Leica 360°-Prism GRZ4, GRZ121		
Bohnenstingl HIP (s.p. 6+7)		
Bohnenstingl TOP (s.p. 10+11)		
Bohnenstingl Prism on L-holders (s.p. 8+9)		
Bohnenstingl RUNDUM 6x60° (s.p. 12+13)		
Bohnenstingl base sewer measuring rod (s.p. 26-35)		
Bohnenstingl HIP (s.p.6+7)		
Bohnenstingl TOP and ONRT (s.p. 10+11)		
Bohnenstingl Prism on L-holders (s.p. 8+9)		
Bohnenstingl base sewer measuring rod (s.p. 26-35)		
Leica Mini GMP111	-16,9	+17,5
Prisms from Sokkia, Pentax, tlw. Topcon		
Bohnenstingl HIP (s.p. 6+7)		
Bohnenstingl TOP and ONRT (s.p. 10+11)		
Bohnenstingl Prism on L-holders (s.p. 8+9)		
Bohnenstingl base sewer measuring rod (s.p. 26-35)		
Leica Standardprism GPH1, GPR121, GPR111		
Bohnenstingl HIP (s.p. 6+7)		
Bohnenstingl TOP and ONRT (s.p. 10+11)		
Bohnenstingl Prism on L-holders (s.p. 8+9)		
Bohnenstingl base sewer measuring rod (s.p. 26-35)		
Trimble (Zeiss) ETR, KTR, KTO, KTM)		
Bohnenstingl HIP (s.p. 6+7)		
Bohnenstingl TOP and ONRT (s.p. 10+11)		
Bohnenstingl Prism on L-holders (s.p. 8+9)		
Bohnenstingl base sewer measuring rod (s.p. 26-35)		
	-34,4	0
	-35	-0,6

Small prisms with matched prism constants

A total station is usually purchased together with a standard prism. Small prisms or 360° prisms made by the same manufacturer have constants different from that of the standard prism, making it necessary to adjust the set-tings for prism constants in the total station.

Total stations with automatic prism type recognition are not yet on the market. If one forgets to make the necessary adjustment (even if it only means pressing a button), the measurement results are often seriously thrown off. This source of error can be eliminated only by making sure that the prisms used have constants matching those of the standard prisms.

For this reason we have developed small prisms with constants identical to those of all the standard prisms of major manufacturers. Because we use high-quality glass in combination with high accuracy, the dimensions of these prisms are fully ade-

quate for the high-performance total stations on the market today. In addition, the prisms are designed to achieve an accuracy that is close to the theoretical limit.

The table shows all the prisms that are available from us (with the corresponding prism constants).

A special feature of all prisms used in the HIP series, the L holders and the Vektor System sewer measuring rod is that they turn on **the centre of symmetry**. That is, the tilting axis and the vertical axis pass through the optical centre of the prism. Inaccurate adjustment of a prism to the total station thus has a minimal effect on measurements of angles and distances. This is a great advantage when only the prism centre is available as a target or when automatic targeting is used.

These prisms can be used for **precision measurements**.

A prism constant for every surveying task?

Modern total stations with automatic targeting or tracking need 360° prisms as reflectors. These prisms ensure continuous reflection even with moving targets (measurement assistant or one-man operation).

The two large 360° reflectors made by Leica, GRZ4 and GRZ121, have a true prism constant of $K = -11.3$ mm (+23.1 mm according to Leica's definition). They are well suited for terrain surveys and profile measurements in one-man measuring mode and are therefore often found in measuring equipment. Their disadvantages are their size, weight and price, along with lower accuracy in automatic targeting. Owing to the design of the reflectors, the optical centres of all the 360° prisms available up to now "wander" from the vertical axis depending on how far the prism pole has turned. This effect also occurs to a lesser degree in Leica's 360° mini prism GRZ101. In addition, this prism has a different prism constant, amounting to $K = -4.4$ (+30 mm by Leica's definition).

For this reason we have developed the new RUNDUM prism 6x60°, which is matched to the con-

stants of the abovementioned large 360° prisms made by Leica.

Because each prism's **centre of symmetry** is located exactly on the vertical axis of the holder, the RUNDUM prism 6x60° is also suitable for **precision measurements**.

Thus, for all surveying tasks in which a **constant $K = -11.3$ mm (Leica definition = +23.1 mm)** is required, it is possible to use the following **prism family**:

- Original Leica 360° reflectors GRZ4 and GRZ121
- HIP tiltable prism (see catalogue, pp. 6+7)
- TOP tiltable prism (see catalogue, pp. 10+11)
- Tiltable prism on L holder (see catalogue, pp. 8+9)
- Universal prism pole (sewer measuring rod), Vektor System (see catalogue, pp. 26-35)
- RUNDUM prism 6x60° (see catalogue, pp. 12+13).



RUNDUM prism 6x60°



Mini prism + holder: series HIP

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

- a nice holder and a tiltable prism build a compact unity;
Tilting resistance can be defined.
- very low need for space of the cylindrical prism holder (radius only 22 mm)
- Special prisms for all prism constants. **Tilting axis and vertical axis are always crossing the visible prism center (central symmetric point).**
- Glass diameter = 18 mm for prism constant K = -11 mm, for all other Ø = 25 mm.
- For measuring in longer distances, the cylindrical holder format provides a secure and exact targeting.
- High grinding accuracy of the prism glass, the range of the distance measuring is from 500 to 1000m depending on instrument and weather.
- silver coated reflective surfaces; the prism in the casing remains clear also under extreme weather conditions (difference in temperature)
- stable aluminium construction of the prism casing and holder.
- highest degree of precision assured by complete CNC-work – no casting mould.
- Good visibility of the holder due to orange-red signal colour
- widely usable due to the connections on both sides, either 5/8" – 5/8" or 5/8" – vertical bolt Leica.
- optimal accessories
- Option: prism center is marked in red
- Option: unscrewable tilting axis stub (2 pieces)
--> better visibility of the holder in larger distances
--> exact measuring of a target point with a cross eccentricum of 50 mm.
- Target with high quality reflecting foil (26 x 40 mm) as inexpensive alternative to glass prisms.

Available with the following **prism constants K** (Leica in brackets): - see also catalogue page 4 -

Reflector / Prism	Prism constant K (Leica in brackets)
Reflecting target (26 x 40 mm)	o (+34,4) mm
Glass prism ø 18 mm	-11 (+23,1) mm = LEICA 360°-PRISM
Glass prism ø 25 mm	-16 (+18,4) mm
Glass prism ø 25 mm	-30 (+4,4) mm
Glass prism ø 25 mm	-34 (o) mm
Glass prism ø 25 mm	-35 (-0,6) mm

The prism constant o (+34,4) mm in HIP format is not available with a glass prism, as there is no way to place it in the prism center. In design TOP and ONRT see pages 10 and 11.

Prisms with 5/8" thread

Prism HIP 2x5/8"

prism holder in closed format:

- 5/8" female thread on top and bottom with 50 mm tilting axis height each.
- circular level optional: see catalogue page 14

	Reflecting target Order-Nr.	Prism centre regular format Order-No.	prism centre Red marked Order-No.
without tilting axis stub	1615 123,- €	1610.xx 240,- €	1611.xx 245,- €
with 2 tilting axis stubs	1615.Z 136,- €	1610.xx Z 253,- €	1611.xx Z 258,- €

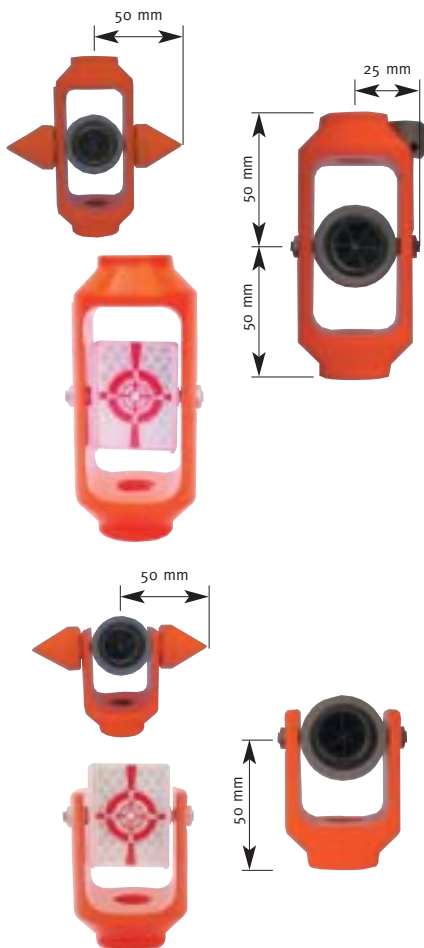
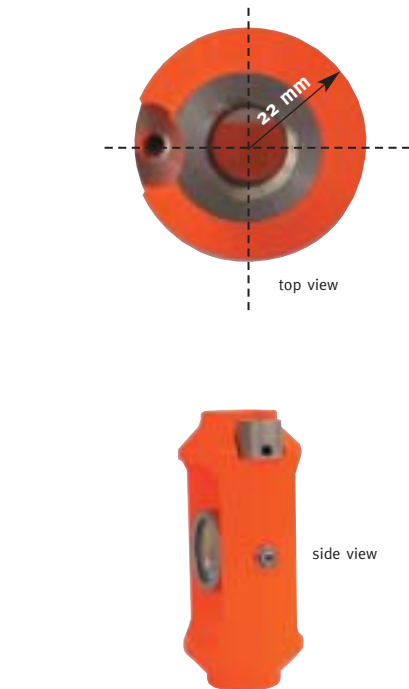
xx: please specify the prism constant from the table above (in red), without +/- signs. Holders, that are ordered without tilting axis stubs, can be refit in a limited way only.

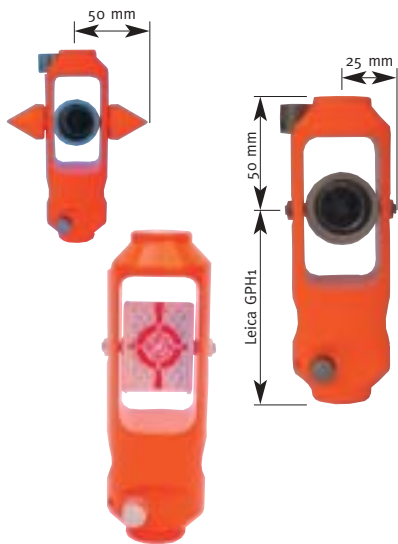
Prism HIP-U 5/8"

prism holder in U-format with 50 mm tilting axis height.

	Reflecting target Order-Nr.	Prism centre regular format Order-No.	prism centre red marked Order-No.
without tilting axis stub	1625 75,- €	1620.xx 192,- €	1621.xx 197,- €
with 2 tilting axis stubs	1625.Z 88,- €	1620.xx Z 205,- €	1621.xx Z 210,- €

xx: please specify the prism constant from the table above (in red), without +/- signs. Holders, that are ordered without tilting axis stubs, can be refit in a limited way only.





Prisms with Leica connection

Prism HIP Leica-5/8"

Prism holder in closed format:

- Leica vertical bolt connection Ø 12mm (push-button connection) with a tilting axis height = Leica round prism GPH1.
- On the top, additional 5/8" female thread with 50 mm tilting axis height.
- Optional: circular level – see catalogue page 14

	Reflecting target Order-No.	Prism centre regular format Order-No.	prism centre red marked Order-No.
without tilting axis stub	1635 149,- €	1630.xx 266,- €	1631.xx 271,- €
with 2 tilting axis stubs	1635.Z 162,- €	1630.xx Z 279,- €	1631.xx Z 284,- €

xx: please specify the prism constant from the table above (in red), without +/- signs. Holders, that are ordered without tilting axis stubs, can be refit in a limited way only.



Prisms HIP-U Leica

Prism holder in U-format with Leica vertical bolt connection Ø 12mm (push-button connection)

	Reflecting target Order-No.	Prism centre regular format Order-No.	prism centre red marked Order-No.
without tilting axis stub	1645 100,- €	1640.xx 217,- €	1641.xx 222,- €
with 2 tilting axis stubs	1645.Z 113,- €	1640.xx Z 230,- €	1641.xx Z 235,- €

xx: please specify the prism constant from the table above (in red), without +/- signs. Holders, that are ordered without tilting axis stubs, can be refit in a limited way only.

Accessories for series HIP and HIP-U

Distance pin

For holders with glass prisms

HD 50 and HD 100 to measure vertical points, e.g. building fronts. Can be screwed in the M6-thread at the back side of the prism casing. Available for every system constant to reach a round distance (= longitudinal eccentricity) to the top of the pin (object point).

Prism constant defined at the total station/EDM (Leica in brackets)	Longitudinal eccentricity (correction)			
	+ 50 mm		+ 100 mm	
	Article	Order-No.	Article	Order-No.
-11 (+23,1) mm	HD50/11	1650.39 7,20 €	HD100/11	1650.89 7,20 €
-16 (+17,5) mm	HD50/16	1415.34 7,20 €	HD100/16	1415.84 7,20 €
-30 (+4,4) mm	HD50/30	1650.50 7,20 €	HD100/30	1650.100 7,20 €
-34 (0) mm	HD50/30	1650.50 7,20 €	HD100/30	1650.100 7,20 €
-35 (-0,6) mm	HD50/30	1650.50 7,20 €	HD100/30	1650.100 7,20 €

For holders with reflecting foil:

The distance pin will be screwed into the back side of the tiltable target holder. The distance from the top of the pin to the vertical axis is exactly 50 mm. Therefore, a longitudinal eccentricity (correction) of +50 mm has to be considered when measuring with a distance pin.

Distance pin RD 50	Order-Nr. 1029.50	7,50 €
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Prisms and reflectors on L-holders

The newly developed holders are characterised as follows:

- Stable L-profile made of aluminium with a protective coating in orange-red signal colour
- Complete program of mini glass prisms is available with every required prism constant
- NEW: with reflecting foil as inexpensive alternative to glass prisms
- Precision fabrication and placing of the prisms/foils in the visible prism centre. Therefore minimised errors in the angle and distance measurements, also with a prism/reflector not correctly aligned to the total station/EDM.
- Widely usable because of maintaining general standards:
 - Tilting axis height 50 mm with 5/8" thread
 - Tilting axis height identical with Leica prism system with Leica vertical bolt

Compatible to accessories (see catalogue page 14-16).

Prisms/Reflectors with 5/8" thread connection

- 5/8" female thread and 50 mm tilting axis height
- The tilting resistance can be done with a fork spanner (13 mm).
- Available with all prisms of the series HIP (see catalogue page 6+7) and the series TOP (see catalogue page 10).
- Available also with high quality reflecting foil (40 x 40 mm) as inexpensive alternative to glass prisms for modern total stations/EDM.
- A simple circular level is integrated in the holders with prisms of the series HIP

Prism constant (Leica in brackets)	Holder			
	With glass prism Ø 25 mm (s. series HIP catalogue p. 6 -with circular level-	With glass prism Ø 18 mm (s. series HIP catalogue p. 6 -with circular level-	For mini prism MP24 (s. series TOP catalog- ue p. 10) with tilta- ble prism connection - without prism -	Reflecting foil on tiltable holder
	Order-No.	Order-No.	Order-No.	Order-No.
0 (+34,4) mm	—	—	1010.0	51,- € 1020.0* 40,- €
-11 (+23,1) mm (=Leica 360° prism)	—	1000.11*	122,- € 1010.11	51,- € —
-16 (+18,4) mm	1000.16*	122,- €	—	1010.16* 51,- € —
-30 (+4,4) mm	1000.30*	172,- €	—	1010.30 51,- € —
-34 (0) mm	1000.34*	172,- €	—	1010.34 51,- € —
-35 (-0,6) mm	1000.35*	172,- €	—	1010.35 51,- € —

Prisms/reflectors with Leica connection

- Leica vertical bolt connection Ø 12 mm and tilting axis height of the Leica prism system.
- After placing on the vertical bolt and aligning to the total station/EDM, the holder will be fixed with a set screw.
- The tilting resistance can be done with a fork spanner (13 mm).
- Available with all prisms of the series HIP (s. cat. p. 6+7) and of the series TOP (s. cat. p. 10)
- Available also with high quality reflecting foil (40 x 40 mm) as inexpensive alternative to glass prisms for modern total stations/EDM

Prism constant (Leica in brackets)	Holder			
	With glass prism Ø 25 mm (s. series HIP catalogue p. 6	With glass prism Ø 18 mm (s. series HIP catalogue p. 6)	For mini prism MP24 (s. series TOP catalog- ue p. 10) with tilta- ble prism connection - without prism -	Reflecting foil on tiltable holder
	Order-No.	Order-No.	Order-No.	Order-No.
0 (+34,4) mm	—	—	1012.0	51,- € 1022.0* 40,- €
-11 (+23,1) mm (= LEICA 360°-PRISM)	—	1002.11*	122,- € 1012.11	51,- € —
-16 (+18,4) mm	1002.16*	122,- €	—	1012.16* 51,- € —
-30 (+4,4) mm	1002.30*	172,- €	—	1012.30 51,- € —
-34 (0) mm	1002.34*	172,- €	—	1012.34 51,- € —
-35 (-0,6) mm	1002.35*	172,- €	—	1012.35 51,- € —

Note regarding the above tables:

- For all prism holders marked with *, the tilting axis and the vertical axis go through the visible prism centre. For the holder with reflecting foil, they go exactly through the centre of the printed target.
- Further details regarding prism and addition constants, please see catalogue page 4.



Prisms/Reflectors with boring for M8 screw

Boring to attach by M8 screw on bolts or plugs with M8 female thread

The ideal prism for the permanent **construction surveying**:

- Because of the cardanic installation the prism can be aligned on every stand point
- Need of one tool only (fork spanner 13 mm) to a) fix the holder at the building and b) to fix the tilting axis
- Durable, robust attachment at the building by a large set screw and a holder made of full metal
- Available with all prisms of the series HIP (s. catalogue p. 6+7) and of the series TOP (s. catalogue p. 10)
- Available also with high quality reflecting foil (40 x 40 mm) as inexpensive alternative to glass prisms
- Delivery with M8 screw made of stainless steel and wearing part.



HIP Ø 25 mm



TOP



Reflecting foil



Prism constant (Leica in brackets)	Holder			
	With glass prism Ø 25 mm (s. series HIP catalogue p. 6)	With glass prism Ø 18 mm (s. series HIP catalogue p. 6)	For mini prism MP24 (s. series TOP catalog- ue p. 10) with tilta- ble prism connection- without prism -	Reflecting foil on tiltable holder
	Order-No.	Order-No.	Order-No.	Order-No.
0 (+34,4) mm	—	—	1015.0	1025.0*
-11 (+23,1) mm (= LEICA 360°-PRISM)	—	1005.11*	1015.11	—
-16 (+18,4) mm	1005.16*	—	1015.16*	—
-30 (+4,4) mm	1005.30*	—	1015.30	—
-34 (0) mm	1005.34*	—	1015.34	—
-35 (-0,6) mm	1005.35*	—	1015.35	—

Note:

- For all prism holders marked with *, the tilting axis and the vertical axis goes through the visible prism centre. For the holder with reflecting foil, they go exactly through the centre of the printed target.
- Further details regarding prism and addition constants, please see catalogue page 4.

Accessories

Distance pins

The use of distance pins is possible for:

Holders with prisms of the series HIP: see catalogue page 7

Holders with prisms of the series TOP: see catalogue page 11

Holders with Reflecting foil

Distance pin will be screwed into the rear side of the tiltable target holder. The distance from the top of the pin to the vertical axis is exactly 50 mm. Therefore, a longitudinal eccentricity (correction) of +50 mm has to be considered when measuring with a distance pin.

Distance pin RD 50	Order-No. 1029.50	7,50 €
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Additional accessories

See catalogue pages 14-16



Mini prism MP 24

Mini prism MP 24 (construction similar to OMNI- and CST- mini prism)

Mini prism MP 24 (construction similar to OMNI- and CST- mini prism)	
Ø Glass prism	: 25 mm
Ø Casing	: 31 mm
Ø effective light entrance area	: 24 mm
Grinding accuracy	: 2"
Casing material	: Aluminium, anodised in black
Range distance measuring (weather)	: 500 to 1000 m (depending on EDM instrument and weather)
Prism constant on the top of the distance pin	: 0
Thread distance pin	: M 6
Weight	: 30 g
Reflective surface	: silver coated



Mini prism MP 24

Order-No. 1410

90,- €

Same as above, however with special position of the prism in the casing. Therefore shock resistant and water-proof.

Mini prism MP 24 S

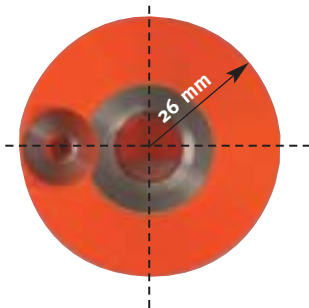
Order-No. 1400

115,- €

Holder for MP 24: series TOP and typ ONRT

Available with the **prism constants K** (Leica in brackets): - see catalogue page 4 -

Reflector/prism	prism constant K (Leica in brackets)	comments
Reflecting target (26 x 40 mm)	0 (+34,4) mm	only available in ONRT 50 and ONRT L
mini prism MP 24	0 (+34,4) mm	
mini prism MP 24	-11 (+23,1) mm = LEICA 360°-PRISM	only available in design TOP
mini prism MP 24	-16 (+18,4) mm	
mini prism MP 24	-30 (+4,4) mm	
mini prism MP 24	-34 (0) mm	
mini prism MP 24	-35 (-0,6) mm	

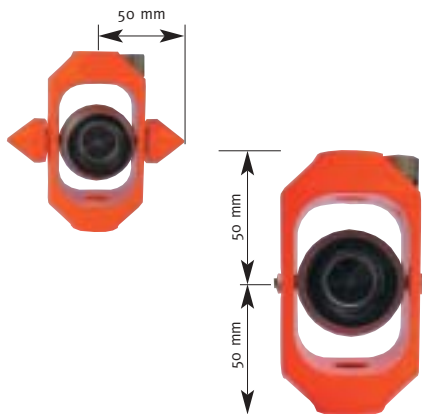


Prisms with 5/8"- thread connection

Prism TOP 2x5/8"

Prism holder in closed format:

- 5/8" female thread on top and bottom with 50 mm tilting axis height each.
- Same characteristics and applications as series HIP.
- However, in the HIP series, the prism and holder are an unity, whereas in the TOP series the mini prism MP 24 can be unscrewed from the holder and used for a different purpose.
- Optional: Circular level – see catalogue page 14



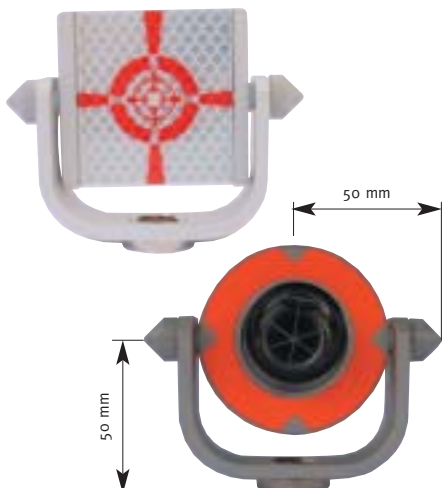
	Holder TOP without prism MP24 Order-No.	Halter TOP with prism MP24 Order-No.	Halter TOP with prism MP24 S Order-No.
without tilting axis stub	1515.XX 117,- €	1510.XX 192,- €	1511.XX 217,- €
with 2 tilting axis stubs	1515.XX Z 130,- €	1510.XX Z 205,- €	1511.XX Z 230,- €

xx: please specify here the required prism constant (red) from above table without +/- signs. Holders, that are ordered without tilting axis stubs, can be refit in a limited way only.

Prism type ONRT 50

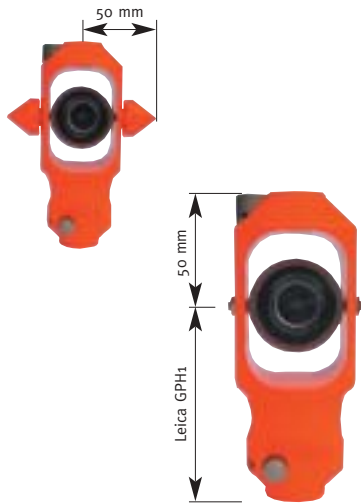
Prism holder in U-format with 50 mm tilting axis height:

- holder made of anodised aluminium, MP24 possible to unscrew.
- adjustable tilting resistance
- integrated target with a bright red target ring and target wedge optimised in vertical and tilting axis. Therefore minimised target error also in case prism is not aligned.
- 2 tilting axis stubs for measuring with cross eccentricities.
- Optional: circular level – see catalogue page 14
- Target with high quality reflecting foil (52x60mm) available as inexpensive alternative to glass prisms.



Holder ONRT 50 With reflecting target Order-Nr.	Holder ONRT50 without prism MP24 Order-No.	Holder ONRT 50 with prism MP24 Order-No.	Holder ONRT 50 with prism MP24 S Order-No.
628 65,- €	625.XX 71,- €	620.XX 161,- €	621.XX 176,- €

xx: please specify here the required prism constant (red) from above table without +/- signs. Holders, that are ordered without tilting axis stubs, can be refit in a limited way only.



Prisms with Leica connection

Prism TOP Leica-5/8"

Prism holder in closed format:

- Leica vertical bolt connection Ø 12 mm (push-button connection) with a tilting axis height = Leica round prism GPH1.
- At the top, additional 5/8" female thread with 50 mm tilting axis height.
- Same characteristics and applications as series HIP. However, in the HIP series, the prism and holder are an unity, whereas in the TOP series the mini prism MP 24 can be unscrewed from the holder and used for a different purpose.
- Optional: Circular level – see catalogue page 14

	Holder TOP without prism MP24 Order-No.	Holder TOP with prism MP24 Order-No.	Holder TOP with prism MP24 S Order-No.
without tilting axis stub	1525.xx 143,- €	1520.xx 218,- €	1521.xx 243,- €
with 2 tilting axis stubs	1525.xx Z 156,- €	1520.xx Z 231,- €	1521.xx Z 256,- €

xx: please specify here the required prism constant (red) from above table without +/- signs. Holders, that are ordered without tilting axis stubs, can be refit in a limited way only.

Prism type ONRT L

Prism holder in U-format with Leica vertical bolt connection Ø 12 mm (push-button connection):

- holder made of anodised aluminium, MP24 can be unscrewed.
- Adjustable tilting resistance
- integrated target with a bright red target ring and target wedge optimised in vertical and tilting axis. Therefore minimised target error also in case prism is not aligned.
- 2 tilting axis stubs for measuring with cross eccentricities.
- Optional: circular level – see catalogue page 14
- Target with high quality reflecting foil (52x60mm) available as inexpensive alternative to glass prisms..

Holder ONRT L With reflecting target Order-No.	Holder ONRT L without prism MP 24 Order-No.	Holder ONRT L with prism MP 24 Order-No.	Holder ONRTL with prism MP 24 S Order-No.
658 91,- €	655.xx 97,- €	650.xx 196,- €	651.xx 207,- €

Accessories for series TOP and type ONRT

Pin extensions MPV 50 and MPV 100

To measure vertical points, e.g. building fronts. Can be screwed into the M6-distance pin at the rear of the MP24. Available for each system constant to reach a round distance (= longitudinal eccentricity) to the top of the pin (object point).

Prism constant defined at the total station/EDM (Leica in brackets)	Longitudinal eccentricity (correction)			
	+ 50 mm		+ 100 mm	
	Article	Order-No.	Article	Order-No.
0 (+34,4) mm	MPV50/0	1415.50 7,20 €	MPV100/0	1415.100 7,20 €
-11 (+23,1) mm	MPV50/11	1415.39 7,20 €	MPV100/11	1415.89 7,20 €
-16 (+18,4) mm	MPV50/16	1415.34 7,20 €	MPV100/16	1415.84 7,20 €
-30 (+4,4) mm	MPV50/30	1415.20 7,20 €	MPV100/30	1415.70 7,20 €
-34 (0) mm	MPV50/34	1415.16 7,20 €	MPV100/34	1415.66 7,20 €
-35 (-0,6) mm	MPV50/35	1415.15 7,20 €	MPV100/35	1415.65 7,20 €

Note: To measure points directly with the top of the pin of the MP 24 (without extension) you have to consider as longitudinal eccentricity for the measured distance the prism constant defined at the total station/EDM (not the values in bracket) with positive sign.

For holders with reflecting foil

Distance pin will be screwed at the rear side into the tiltable target holder. Then, the distance from the top of the pin to the vertical axis is exactly 50 mm. Therefore you have to consider a longitudinal eccentricity (correction) of +50 mm.

Distance pin RD 50	Order-Nr. 1029.50	7,50 €
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Rundum prism 6x60°

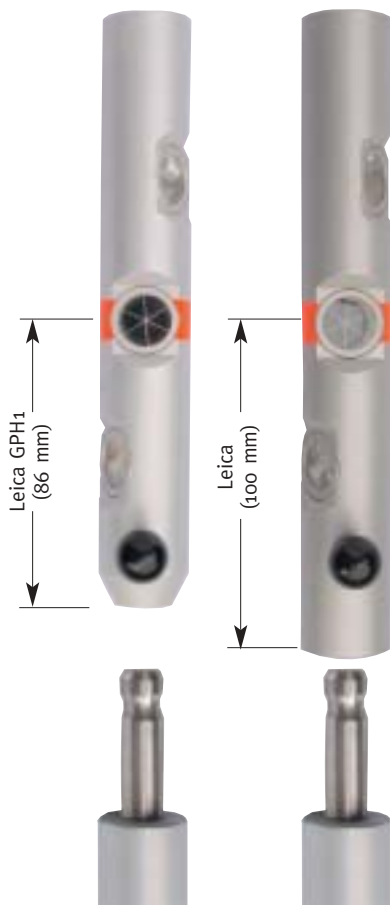
An “all-around” (Rundum) prism – also called 360° prism – always has a reflection surface for the electro-optical distance measurement with the total station/EDM, independent of its alignment. It also allows the reliable and therefore economic use of special function as automatic targeting (ATR), target pursuance (Lock mode) and target search (power search).

Our newly developed RUNDUM prism allows all these applications. It consists of 6 triple prisms, which are staggered by 60° and inserted in a thin aluminium cylinder. In this way, there are always 2 prism centres that point in the direction of the total station/EDM. The prisms are installed in a vertical staggered position; so, each of the 6 prisms could be installed in the central symmetric point, that means the axis of the cylindrical prism holder goes for all prisms through the visible prism centre.

In this way, it is for the first time, that with the 6x60° prism there is a RUNDUM prism also for precision measurements, for which the positioning of the total station/EDM should be done automatically.

Construction and characteristics of the 6x60° prism in detail:

- Prism constant $K = -11,3 \text{ mm}$ (Leica system: $+23,1 \text{ mm}$), therefore identical with the Leica-360° reflectors GRZ4 and GRZ121.
 - Cylindrical prism holder ($\varnothing 28 \text{ mm}$) made of anodized aluminium
 - 6 precision prisms (not tiltable), $\varnothing 18 \text{ mm}$, silver coated reflective surfaces, each prism staggered by 60° (as the prisms are not tiltable, it might be necessary to use a tiltable single prism in case of very upright measuring)
 - the vertical axis of the prism cylinder goes through the visible prism centre (central symmetric point) of all 6 prisms
 - 2 possibilities for connection: 1x Leica vertical bolt connection, 1x 5/8" thread connection
 - Lock of the Leica vertical bolt by newly designed push spring lock.
 - Vertical coordination of certain prisms for an exact altitude measurement:
 - On the side of the Leica connection, the 3rd prism is exactly on the level of the Leica standard prism GPH1
 - On the side of the 5/8" connection, the 2nd prism is exactly on the level of 50 mm
- Remark: if you need to do not only an exact position measurement but also a correct altitude measurement, the corresponding prism has to be turned in direction of the total station/EDM. This is marked on the cylindrical prism holder.
- It is very suitable also for the sighting frame stake out with automatic targeting; in the one-man-operation mode very recommendable in connection with the pendulum holder (see picture next page):
 - Takes up little space on the sighting frame due to the slim construction of the prism cylinder
 - Because of the special position of the prisms no errors in the horizontal angle measurement as with other 360° prisms.
 - In case of local vertical obstacles on the sighting frame (crossbeam, etc.), a prism can be aligned to the total station/EDM simply by turning (because of the different prism levels).



The RUNDUM prism 6x60° is available in the following formats:

With Leica vertical bolt connection $\varnothing 12 \text{ mm}$ (for vertical bolts length 27 and 40 mm) and 5/8" female thread, total length 179 mm, weight: 220 g.

RUNDUM prism 6x60°, Leica St27 – 5/8" I

Order-No. 5660.27

630,- €

With Leica vertical bolt connection $\varnothing 12 \text{ mm}$ (only for vertical bolts length 40 mm) and 5/8" female thread, total length 193 mm, weight: 250 g

RUNDUM prism 6x60°, Leica St40 – 5/8" I

Order-No. 5660.40

630,- €

Accessories

Our full assortment of accessories can be used on the two universal connections, Leica vertical bolt connection and 5/8" thread.

Examples:

RUNDUM prism (all around), 6x60 with the stake out pin Leica (see catalogue page 16) and circular level Zentral (see catalogue page 14)

Stake out pin Leica, height 200 mm

Order-No. 1858.140

38,- €

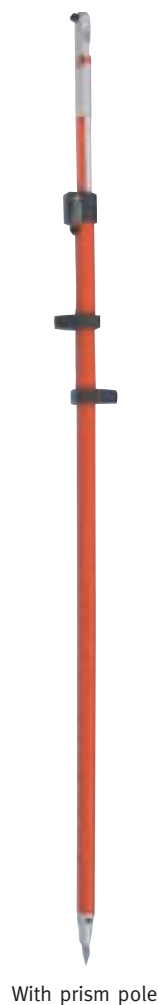
Circular level Zentral, accuracy 50'

Order-No. 1585.50

23,- €



Examples of use:



Accessories prism series HIP, HIP-U, TOP, ONRT and RUNDUM 6x60°

Circular level Integral (only series HIP and TOP)



Can be screwed at the top 5/8" connection at the side of the prism holder. Therefore free availability of the 5/8"-connection for other purposes. (Cannot replace the circular level of the prism pole!)

- Level Ø 14 mm in a metal casing
- Grinding accuracy 50'
- tightly fixed in the stainless steel casing (no adjusting screws)
- horizontal boring as support for screwing off and on
- dimensions: Ø 16,5mm, height 13 mm, M5-male thread

Circular level integral

Order-No. 1580

22,- €

Circular level Zentral (only series HIP, TOP and RUNDUM 6x60°)



If the top 5/8" connection is not needed for other purposes, a large circular level can here centrally be screwed in. It is already adjusted on the screwing surface. Not further adjustable. Different accuracies available upon request.

- Glass level Ø 20 or Ø 22,5 mm in a metal casing
- tightly fixed in a casing of anodised aluminium
- large horizontal boring as support for screwing off and on (e.g. with screw driver)
- dimensions: Ø 27mm, height (without thread): 25mm, 5/8"-male thread

Ø glass level	grinding accuracy	Order-No.
20 mm	30'	1585.30 24,50 €
20 mm	15'	1585.15 26,— €
22,5 mm	10'	1585.10 27,50 €



Level made of synthetic material Ø 15 mm, accuracy 50'

Order-No. 1585.50

23,- €

Circular level for prism type ONRT



Can be screwed on prism type ONRT 50 and ONRT L.

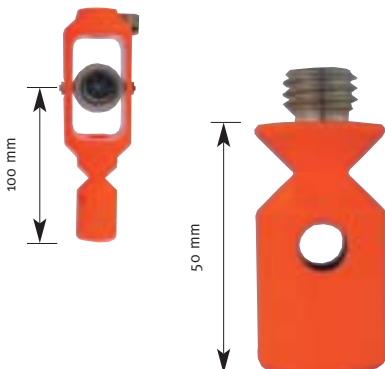
- adjustable
- sensitivity 25'
- level diameter: 14 mm

Circular level JDL 14

Order-No. 1850

34,- €

Extension 50 mm



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

- Diameter (27 mm) and signal coloured in orange-red, adapted to series HIP and TOP.
- waisted for exact targeting
- large horizontal hole to help with screwing on and off (e.g. with a screwdriver)

Extension HV 50

Order-No. 301.50

24,50 €

Accessories prism series HIP, HIP-U, TOP, ONRT and RUNDUM 6x60°

Adapter Leica 5/8"

Transition from Leica vertical bolt (Ø 12mm) to 5/8" - male thread.
Available in design PRO with quick connection or as single adapter with security screw.

If you screw the adapter Leica 5/8" 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), you obtain the same tilting axis height as with the Leica Reflector GPH1. Therefore, it is best suited for an application with Leica prism poles as well as with our wall adapter WA Leica (see catalogue page 24/25).

1. PRO-Leica Adapter

The practical adapter is characterised by the push-button which enables you to fix the prism on the Leica vertical bolt in a very short time (single handed). Then, the prism can be turned with a slight resistance around the vertical bolt preventing it from falling off.

For all Leica vertical bolts Ø 12 mm

Thread connection	Tilting axis height of the reflector holder	description	Order-No.
5/8"	50 mm	PLA 5/8"	690 45,50 €
5/8"	60 mm	PLAK 5/8"	695 45,50 €
M8	50 mm	PLA M8	680 45,50 €
M10	50 mm	PLA M10	685 45,50 €

2. Single adapter Leica 5/8"

Same function as the PRO-Leica adapter, but a set screw has to be fixed after aligning the adapter on the Leica vertical bolt. As all other dimensions are identical, you would have the same possibilities regarding the adjustment of the tilting axis as with the PRO-Leica adapter PLA 5/8".

For all Leica vertical bolts Ø 12 mm:

Adapter Leica St 27 – 5/8"	Order-No. 302.27	24,50 €
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Only for Leica vertical bolts Ø 12 x 40 mm:

Adapter Leica St 40 – 5/8"	Order-No. 302.40	24,50 €
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Adapter 5/8" – Leica

Transition from 5/8" female or male thread to Leica vertical bolt.

- precisely manufactured stainless steel construction
- **2 supports to screw on and off:** moulding area for fork spanner 24 mm
large horizontal boring for screw driver etc. (only order-No. 378.27)

Bottom 5/8"-thread	Top Leica-vertical bolt	effective total length	Order-No.
Female	Ø 12 x 40 mm (St 40)	60 mm	377.40 24,50 €
Female (without picture)	Ø 12 x 27 mm (St 27)	47 mm	377.27 24,50 €
Male	Ø 12 x 40 mm (St 40)	60 mm	376.40 24,50 €
Male	Ø 12 x 27 mm (St 27)	40 mm	378.27 24,50 €

Carrying pouch for mini prism

Padded pouch made of durable fabric, high-quality finish and equipped with:

- belt loop
- shoulder strap
- 2 side pockets
- size: 11 x 15 x 5 cm

Pouch TMP	Order-No. 1600	19,50 €
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Accessories prisms HIP, HIP-U, TOP, ONRT and RUNDUM 6x60°

Stake out pins

For all reflector holders with 5/8" female thread or Leica vertical bolt connection. Because of the low distance from the center of the prism to the stake out pin, targets (in connection with a circular level) can be exactly staked out. Longer models (b = 200 and 250 mm) with a long pin made of stainless steel. Therefore very suitable for exact staking in ground. The stake out pins are available in several lengths L.

Staking out pins 5/8"

Additional 5/8" male thread at the top of the pin to screw the pin into extensions or prism poles with 5/8"- female thread (pin protected and always there). When using it with 5/8" reflector holders with tilting axis height = 50 mm (e.g. series HIP, HIP-U, TOP and ONRT 50) the following distances b from the center of the prism to the pin can be achieved:

Length L	Extension V	Distance b with tilting axis height 50 mm	with additional male thread	Order-No.	
20 mm	—	70 mm	M6	1852	20,— €
30 mm	5 mm	80 mm	5/8"	1853.2	21,50 €
40 mm	15 mm	90 mm	5/8"	1854.2	21,50 €
50 mm	25 mm	100 mm	5/8"	1855.2	21,50 €
75 mm	50 mm	125 mm	5/8"	1856.75	30,— €
150 mm	50 mm	200 mm	5/8"	1856.150	38,— €
200 mm	50 mm	250 mm	5/8"	1856.200	40,50 €

Stake out pins Leica

When using reflector holders with tilting axis height of the Leica GPH1 (e.g. our reflector holder of the series HIP, HIP-U, TOP, ONRT L and RUNDUM 6x60°), the following distances b from the center of the prism to the pin can be achieved:

Length L	Distance b with tilting axis height = GPH 1	Order-No.	
40 mm	100 mm	1857.2	20,— €
140 mm	200 mm	1858.140	38,— €
190 mm	250 mm	1858.190	40,50 €

Handle (only for series HIP, TOP and RUNDUM 6x60°)

with 5/8" male thread, length approx. 130 mm.

To use at the top 5/8" side of the prism holder of the series HIP, TOP and RUNDUM 6x60°.

Handle 5/8"	Order-No. 700	29,65 €
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Different 5/8" extensions can be screwed between handle and prism. For extensions please see catalogue page 59.

Rail angle SW PRO

Rail angles for exact surveying of the rail position. The reference point P (driving side) is situated at the inner side of the rail, 14 mm below the top of the rail SOK (driving area). This point will be realised exactly by setting the rail angle **SW PRO**.

Structure and advantages:

- metal construction with hardened, 14 mm long cylinder pin for exact set up at the reference point P.
- cylindrical set up of the **SW PRO** on the rail. Therefore, also on rails with a slope, a plumbed use with the same distance to the top of the rail is assured.
- Screwing axis of the prism connection (M8-thread) is exactly situated above the reference point P.
- Possible use of the wall adapter WA50 (see catalogue page 24) for prisms with 5/8" threads or of the wall adapter WA Leica (see catalogue page 24) for prisms with Leica vertical bolt connections Ø 12 mm. For both systems and with a fix rail angle, the prism can be turned around the prism axis and aligned to the total station/EDM.
- Adjustable rubber stop. After setting the rail angle, this stop takes care that the cylinder pin will always be pressed with light pressure on the reference point P. It is adjustable for all rail width, whereas the set-up per rail form has to be done only once. In case you use a prism with upwards extension (e.g. prism pole), the rubber stop provides a secure and reliable positioning of the rail angle on the reference point. The setting can be done in a standing position, which facilitates the work especially with a large number of surveying points. If needed, a marking on the side of the rail can easily be fixed with the small cylinder pin.
- The plumbing of the rail angle including the prism will be accomplished by using a circular level, which can either be fixed at the prism holder or at the prism pole.



Our prisms in closed format of the series HIP and TOP as well as the RUNDUM prism 6x60° are very suitable for use with the rail angle. In the series HIP and TOP the distance rail driving area - prism centre is exactly 120 mm. The same as for the 6x60° prism: When using the 5/8" thread on the 2nd prism from the bottom, for the Leica connection on the 3rd prism from the bottom. But also all other prisms and reflectors can basically be used together with the **SW PRO**.

Rail Angle SW PRO

Order-No. 800

95,— €

Depending on the prism, the following accessories are necessary for the use of the rail angle:

For prisms with 5/8" thread:

Wall adapter WA 50

Order-No. 810

33,50 €

For prisms with Leica vertical bolt connection Ø 12 mm:

Wall adapter WA Leica

Order-No. 830

17,— €

The following prisms and extensions are very suitable for the use with the SW PRO:

Prism series HIP

s. catalogue pages 6+7

Prism series TOP

s. catalogue pages 10+11

Rundum prism 6x60

s. catalogue pages 12 + 13

prism poles

s. catalogue page 36

Ranging Pole Level for Mini Reflectors

Combining a small or a Mini prism with a circular rod level that is fixed on a ranging pole, creates a valuable and robust prism pole.

Characteristics and advantages:

- suitable for ranging poles with different diameters
- adjustable circular level
- possible to attach 1 or 2 mini prisms
- simple installation and removal from the ranging pole
- quick moving on the total ranging pole length
- by fixing the ranging pole level at the bottom of a not exactly plumbed ranging pole, the error of the distance measurement can be minimised
- light weight and takes up little space
- variable possibilities for use

The Ranging Pole Level is available in various designs:

The Ranging Pole Level FRG is fixed on the ranging pole with a high-quality piece of elastic. It is made in a way that conventional use (plumbing of the ranging pole by manual stopping) is assured.

For Mini prisms with M6- male thread (e.g. MP 24, CST, OMNI, TOPCON).

FRG 6	Order-No. 930	32,- €
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For Mini prisms with M10- male thread (e.g. Zeiss P1)

FRG 10	Order-No. 935	32,- €
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A spring steel clamp is fixed at the Ranging Pole Level FRK to fasten it to the Ranging Pole.

For Mini prisms with a M6- male thread (e.g.: MP 24, CST, OMNI, TOPCON)

FRK 6	Order-No. 940	27,- €
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For Mini prisms with a M10- male thread (e.g. Zeiss P1)

FRK 10	Order-No. 945	27,- €
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Ranging Pole Clamp for Mini Reflectors

To adapt small / Mini prisms on Ranging Poles, Plumbing Rods and Target Poles.

Characteristics and fixing at the pole same as with the FRK, however without a circular level.

For Mini prisms with M6- male thread (e.g. MP 24, CST, OMNI, TOPCON).

FK 6	Order-No. 910	14,- €
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For Mini prisms with M10 male thread (e.g. Zeiss P1)

FK 10	Order-No. 915	14,- €
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NOTE:

For all models of ranging pole levels and clamps, you have to consider the same distance addition up to the vertical axis of the pole. The longitudinal eccentricity is dependent on the prism constant defined on the total station/EDM.

When using regular ranging poles (Ø 26-28 mm), the following correction has to be set on the measured horizontal distance:

Prism constant defined on the total station/EDM (Leica in brackets)	Longitudinal eccentricity (correction)
0 (+34,4) mm	+15 mm
-11 (+23,1) mm	+26 mm
-16 (+18,4) mm	+31 mm
-30 (+4,4) mm	+45 mm
-34/35 (0) mm	+50 mm



Prism Swan Neck

- Use of regular mini prisms with round prism casings and defined prism constant at the end of the casing
- direct measuring of points on the surface of the wall and the inside and outside corners of buildings
- Possible to reach points hard to get to by using the flexible swan neck
- the visibility of the reflector is not impeded as it would be when holding the prism by hand
- secure holding of the prism; it will not slip out of the hand
- surveying without application of cross eccentricities
- simple way to extend:
 - with the grip PSGZ – all poles with 5/8" thread (e.g. prism poles),
 - with the grip PSW all regular telescopic extensions of WOLF garden tools.
- when using extension: direct measuring of high situated or inaccessible building fronts, ridge heights, etc.
- quick and exact definition of control points for photogrammetric application

Prism Swan Neck

consists of swan neck (length 40cm), ring clamp for connection to the prism and grip with possibility to extend (without prism)

Grip	extension possible using poles with	Ring clamp for prisms with casing Ø	
		of 25-40mm e.g. MP24/OMNI/CST Order-No.	of 32-50 mm e.g. Zeiss P1 Order-No.
PSGZ	5/8" thread	741 74,50 €	743 74,50 €
PSW	WOLF tool adapters	751 74,50 €	753 74,50 €

Extensions

for grip PSGZ (5/8"-thread) and grip PSW (WOLF-tools):
telescopic poles made of high quality, tread aluminium up to a length of 10 m

- Characteristics:**
- low weight with relatively high solidity
 - anodised protection effective against corrosion
 - simple handling of rotary locks
 - smooth adjustment between minimum and maximum length
 - the poles can be dismantled into the telescopic parts and can be used separately

The big advantage of the flexible prism swan neck, i.e. the possibility to define or arrange the prism according to the electro-optical total station/EDM, is also given when the telescopic pole is fully extended – by pressing it against the wall.

The telescopic poles are available with 5/8"- threads or with the quick lock of WOLF- tools:

connection	for grip	max. length	min. length	description	Order-No:
5/8"	PSGZ	3 m: 2 x 1,5 m	1,60 m	T3Z*	260.3 69,- €
5/8"	PSGZ	10 m: 5 x 2,0 m	2,40 m	T10Z	780 138,- €
WOLF	PSW	10 m: 5 x 2,0 m	2,60 m	T10W	790 138,- €

* Material of the T3Z: fibre glass (GFK) with Ø 23/27 mm and yellow protective finish.

Further extensions for grip PSW:

Original WOLF- tools telescopic extensions

WOLF ZMV1 (175-280 cm)	Order-No. 762	23,- €
WOLF ZMV4 (220-400 cm)	Order-No. 764	31,- €

also available in Garden centres, or "Do It Yourself" stores.

The reachable heights or distances **S** can be calculated as follows:

$$S = 0,5 \text{ m (swan neck)} + 2 \text{ m (body height)} + \text{max. length of the telescopic pole}$$