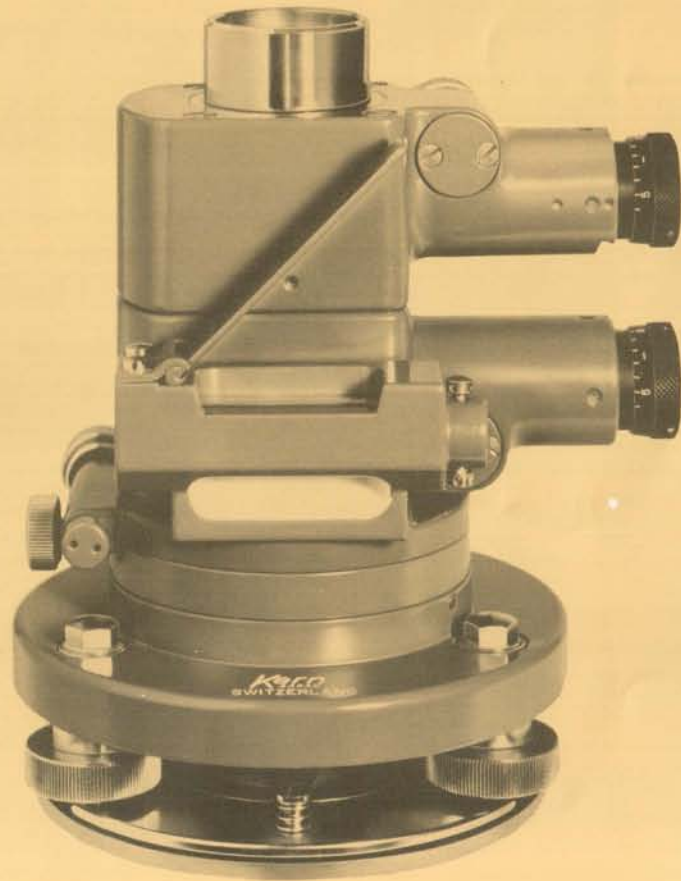




## Kern OL Optical Precision Plummet



### General

The Kern Optical Precision Plummet OL meets the user's requirements for precise vertical alignment equipment which is simple to operate, versatile in its application and designed to withstand hard usage.

### Design

#### Two Separate Telescopes

In order to offer utmost stability, no movable elements such as rotatable mirrors or pentaprisms were used in the optical train. To take vertical sights in both directions, however, the Kern OL features two separate telescope barrels. The eyepiece is always in a horizontal position, with the line of sight deflected at right angles by means of a fixed mirror.

The Kern OL can also be furnished with only one telescope pointing down.

#### Vertical Axis System

The vertical axis system is identical to that of the well-known Kern theodolites series DK; it consists in principle of a precise ball bearing the residual error of which does not exceed  $\pm 2''$  of arc. This construction assures great stability and precision.

#### Leveling

Three regular footscrews allow the instrument to be leveled even when set up on a considerably inclined base. The optical plummet is equipped with a tubular level vial providing for a plumbing accuracy of  $\pm 2''$ ; this accuracy can be improved to  $\pm 1''$  by means of an optional level vial with coincidence read-out.

#### Tripods

For plumbing both up and down with full telescope aperture the special tilting plate tripod no. 184 C and the centering tripod no. 173 C are available. By insertion of adapter plates, the Kern OL can also be set up on the standard centering tripods and trivets as well as on tripods of other makes. However, the use of these stands will restrict the nadir telescope aperture resulting in a loss of light transmission and a corresponding reduction of the usable sighting distance.

Fig. 1  
Kern OL on special centering tripod  
173 C for zenith-nadir plumbing with  
autocentering

- 1 Focusing knob for nadir telescope
- 2 Focusing knob for zenith telescope
- 3 Telescope objective lens of the zenith telescope
- 4 Tubular level vial
- 5 Azimuth slow motion screw
- 6 Azimuth clamp
- 7 Leveling screw
- 8 Tightening plate



The following table lists the available stand—adapter combinations for the various set-up methods.

Set-up method	Stands	Adapter
Plumbing without autocentering, full telescope aperture	Tripod 184 C	184 C-20
Plumbing with autocentering, full telescope aperture	Tripod 173 C	none required
Plumbing with autocentering, but nadir-sight limited to approx. 30 ft.	Tripods 171, 1925, 174, trivets 424, 426, 489	48 B-120
Plumbing without autocentering and limited nadir sight	Kern plate tripod or other tripods with tightening screw 5/8"	48-121 and 48 B-120

All Kern theodolites and targets are readily interchangeable on the special centering tripod 173 C by means of adapter 173 C-250.

### Targets and Scales

Proper design of target patterns is important for high precision plumbing. A target with concentric circles is particularly well suited for precise centering of the optical plummet over or under a station point.

Quite often, a target pattern consisting of two graduated scales at right angles is more advantageous, as it allows to read a possible offset from the station point and therefore does not require accurate centering of the instrument over the reference point. These targets are available with or without electric illumination. As no single pattern can meet all possible requirements, these targets will have to be made according to individual specifications.

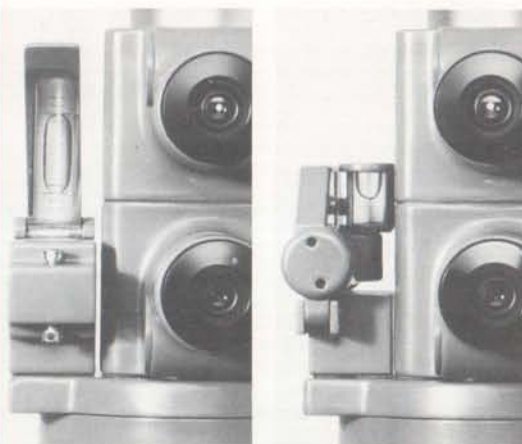
Fig. 2

### Level assemblies

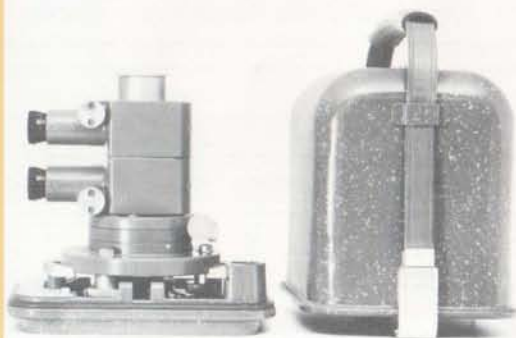
Normally the OL is furnished with a level vial assembly with reading mirror (left). A level vial assembly with coincidence reading is available upon request (right).

Fig. 3

An extra strong metal carrying case assures safe transportation and storage of the Kern OL.



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## Application

Construction: Skyscrapers, towers, masts, scaffolding, structural members, foundations, shafts, penstocks, sluice gates.  
 Industry: Vertical guide rails for conveyors and elevators, pipelines.  
 Deformation measurements on structures.  
 Triangulation: Centering of theodolites on survey towers over triangulation points on the ground.

## Specifications

Telescope aperture	30 mm (1.18 in.)
Telescope magnification	22.5 ×
Diameter of field of view at 100 m (330 ft.)	3 m (9.8 ft.)
Shortest focusing distance	0.8 m (2.6 ft.)
Maximum distance for reading a mm scale	40 m (130 ft.)
Sensitivity of tubular level vial	20" / 2 mm
Sensitivity of coincidence level vial	30" / 2 mm
Plumbing accuracy with tubular level	± 2"
Plumbing accuracy with coincidence level	± 1"
Mean error of a single measurement, for 100 m (330 ft.):	
with tubular level	± 2 mm (0.08 in.)
with coincidence level	± 1 mm (0.04 in.)
Weight of instrument	3.7 kg (8.1 lbs.)
Weight of metal carrying case	1.8 kg (4.0 lbs.)
Weight of complete equipment including standard tripod	10.7 kg (23.6 lbs.)

## Order Data

Optical Precision Plummet OL with zenith-nadir telescopes, complete with metal carrying case and tool compartment, containing dust brush, hexagon socket wrench, angle screwdriver, adjusting pin and chamois leather  
 Optical Precision Plummet OL-N, same as above, but with nadir telescope only

Accessories available upon request:  
 Tripod no. 184 C with adapter no. 184 C-20  
 Centering tripod no. 173 C for plumbing with autocentering  
 Adapter no. 173 C-250 for setting up Kern theodolites and target no. 459 on tripod no. 173 C  
 Centering tripod no. 1925 for zenith plumbing with autocentering  
 Adapter no. 48 B-120 for setting-up the optical plummet on centering tripod no. 1925  
 Adapters no. 148-121 and 148 B-120 for setting-up the optical plummet on tripods with 5/8" tightening screws  
 Trivet no. 424 with centering pin  
 Trivet no. 426 with ball center and height gage  
 Small trivet no. 489 with centering pin  
 Coincidence level assembly no. 48 B-240  
 Targets and scales, made according to individual requirements

We reserve the right to make changes in keeping with technical developments

125e 2.83.SA Printed in Switzerland



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