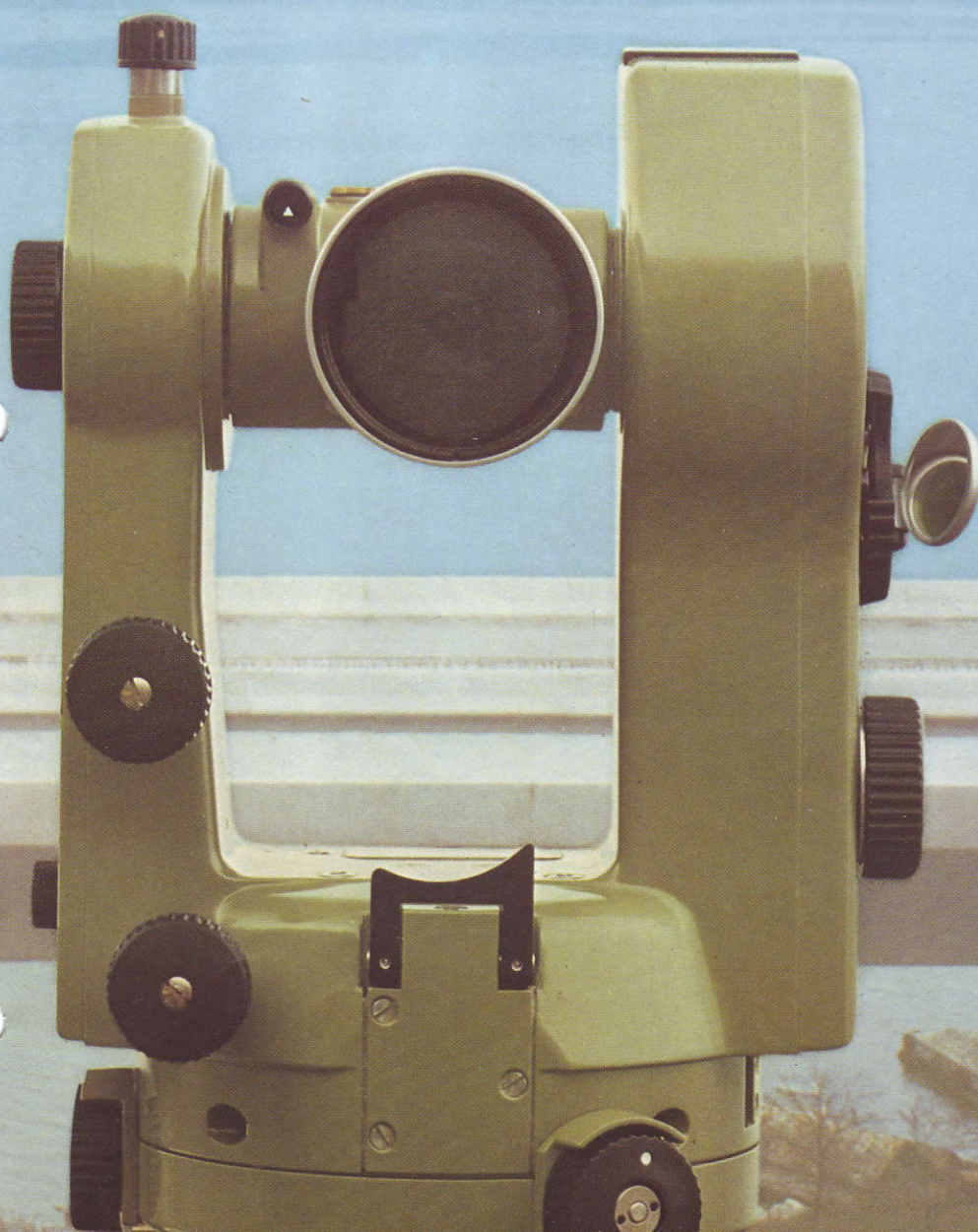


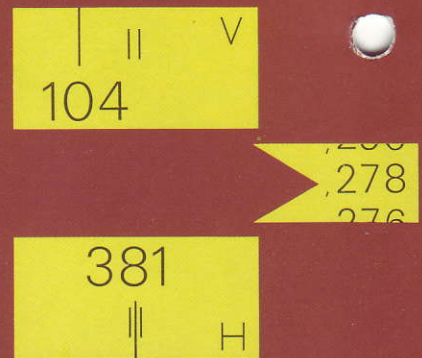


K1M

**Engineer's Theodolite
with Micrometer Reading**

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K1-M reliable and convenient

Simple, digital micrometer circle reading, automatic vertical indexing and exceptionally bright and large circle reading images are the special advantages of the engineer's theodolite K1-M. The instrument also features a repetition clamp and an optical plummet. The possibility of combining the K1-M with the electro-optical distance meter DM 502 considerably expands its already wide field of application. The K1-M meets all practical demands, made on a modern instrument in terms of accuracy, measuring reliability and convenience of operation. It has, furthermore, undergone strict tests, such as those included in military specifications (functional reliability over a wide temperature range, under wet and dusty conditions, in case of shock and impact, etc.). The user thus has a guarantee that the K1-M will continue to operate accurately and reliably under unfavourable and difficult conditions.

Applications

The K1-M is particularly well suited for land survey and engineering measurements, where the accuracy of angular measurements to tenths of a minute is sufficient. The wide range of accessories extends its field of application.

- Fourth order triangulation
- Cadastral surveys: traversing, detail survey and layout work with the DM 502
- Compass traverses
- Topographical surveys
- Obtaining of data for construction and civil engineering projects
- All types of layout work
- Cadastral surveys for utility lines

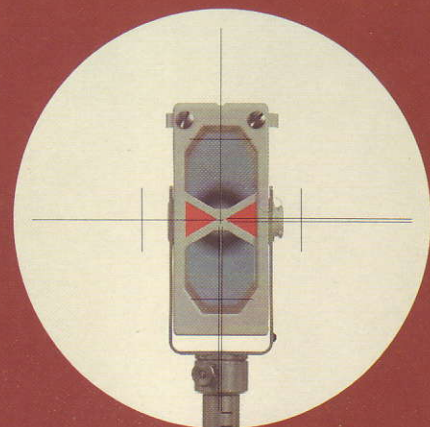
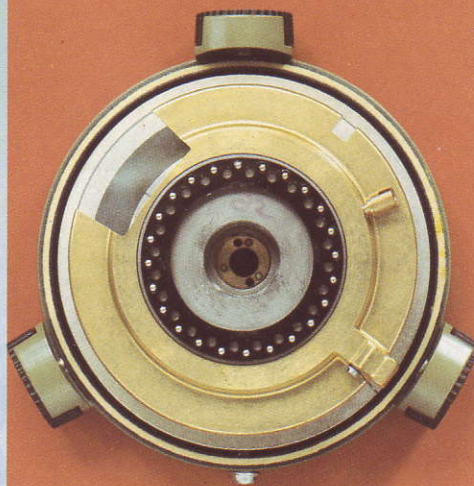
Digital Circle Reading

The horizontal and vertical circle images appear simultaneously in the circle reading eyepiece. The circles and the micrometer are completely numeric which warrants for rapid and accurate work. With the common micrometer, both circles provide direct readings to $6''/2$ mgon and estimates to $3''/1$ mgon.





51' 18"
51' 12"



Above: circle reading 360°
Vertical $86^\circ 51' 15''$
Left: circle reading 400 gon
Horizontal 381.278 gon

Repetition Clamp

The repetition clamping device is used for circle orientation and for the additive measurement of small angles, such as occur during indirect distance measurement with the subtense bar. It also provides a simple means of transferring azimuths from one station to another. Traverses can thus be measured directly by means of directional angles.

Ball Bearing Vertical Axis

A precision ball bearing, of the type which has proved its worth in Kern triangulation theodolites over many decades, forms the vertical axis. This gives an excellent axis stability at a low instrument height.

Pendulum Compensator

In place of the manually adjusted collimation level, the K1-M has a pendulum compensator. It automatically eliminates the influence of inclination of the vertical axis in vertical angle measurements.

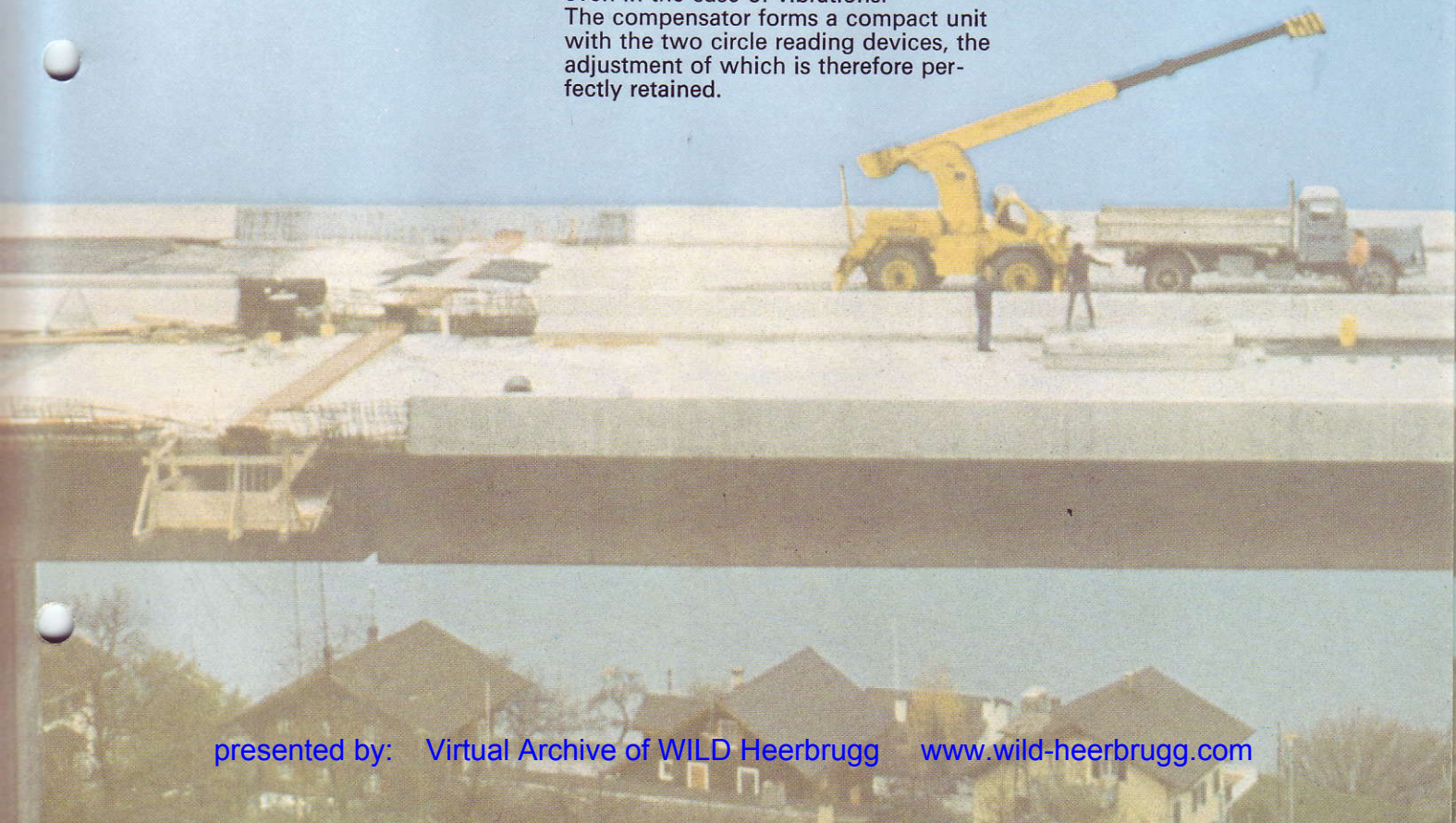
The low-friction mounting of the pendulum on precision ball bearings is capable of meeting the most rigorous requirements; it has proved its reliability in tens of thousands of theodolites and leveling instruments. The effective air damping permits unimpeded reading even in the case of vibrations.

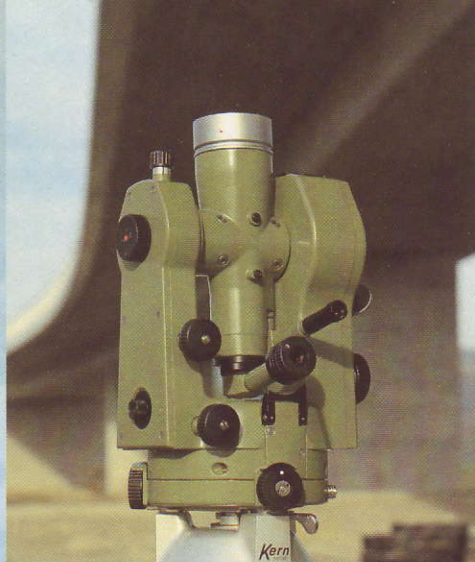
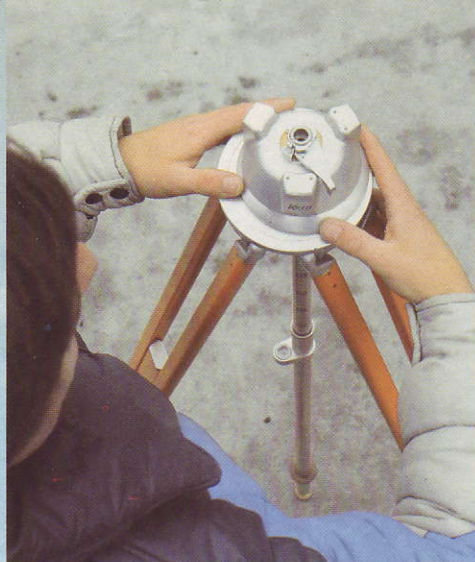
The compensator forms a compact unit with the two circle reading devices, the adjustment of which is therefore perfectly retained.

Telescope

The powerful telescope with its $30\times$ magnification possesses exemplary optical correction and produces a sharp, upright image. All optical components have an anti-reflection coating on both sides. The telescope is fitted with the universal reticule.

The knob of the focusing drive includes a built-in mechanical reduction gear. Approximation of the sharp image is rapidly obtained with the coarse adjustment, while the subsequent backward movement automatically brings in the fine adjust mechanism for exact focusing.





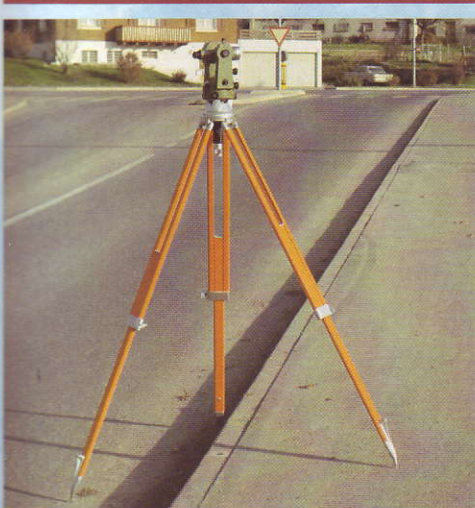
Centering Tripod

The well-known Kern centering tripod makes the setting up of the instrument an unbelievably simple and rapid operation. Since the telescopic centering rod is joined at right angles to the instrument support plate, coarse leveling is obtained automatically and simultaneously with the millimetre-accurate centering. Fractions of a rotation on the leveling knobs on the lower part of the instrument are sufficient for fine leveling.

The joint system of the tripod head is protected against dust and humidity. It is precision-engineered for smooth operation. Dirty tripod heads can be cleaned conveniently and without disassembly. An automatic interlock device snaps the locking lever shut when an instrument or an accessory (reflector, target, or rod foot) is placed on the tripod. The instrument or accessory is thus secured and the locking lever can be tightened.

Elbow Eyepieces

Elbow eyepieces allow very steep and vertical sightings. Thus, the K1-M can also be used as a plummet which is a welcome expansion of its capabilities.



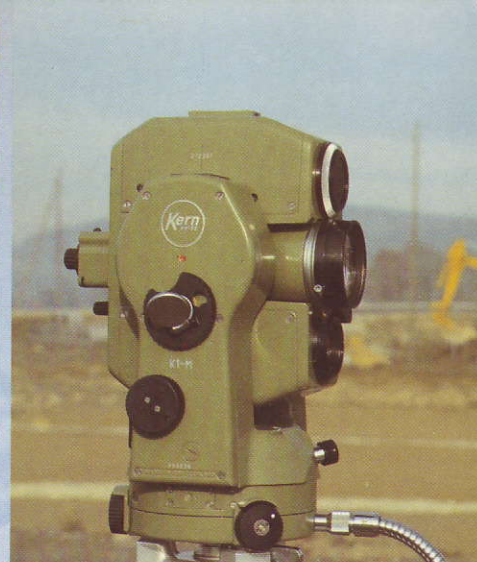
Optical Plummet

The K1-M is fitted with an optical plummet, the focusing range of which extends from 0.7 m to infinity. Accurate centering is thus possible over raised or recessed points without the need for additional equipment.

Forced Centering

The centering tripod affords decisive advantages in measurements requiring forced centering: all Kern instruments and accessories are interchangeable on the various Kern centering tripods by means of a simple manual operation, without the centering being lost.





Circle Illumination

If insufficient light is available, the reading fields are illuminated with the lighting fixture (at left) or with the diode lighting device "Lux-Timer" (at right). The lighting fixture is powered by a small battery attached to the tripod leg or by the battery of the electro-optical distance meter. The "Lux-Timer" has a built-in replaceable 9V battery. It is switched on by depressing a button and will illuminate the reading fields for about 20 seconds.

K1-M Compass Theodolite

Due to its non-magnetic construction, the K1-M is exceptionally suitable for compass surveys. The azimuth of the line of sight can be taken directly from the circular compass. The horizontal circle can be oriented towards the North with the tubular compass.

Combination with the DM 502

The Kern DM 502 electro-optical distance meter can be combined not only with the DKM 2-A one second theodolite or with the scale theodolite K1-S but also with the K1-M. The distance measuring part can be slipped on to the telescope and locked. This ideal instrument combination permits simultaneous measurements of angles and distances, such as are required for cadastral surveys according to the polar method or in layout work on the construction site. Even with the attached DM 502, the telescope of the theodolite can be plunged over both ends. The power supply passes from the supply unit on the tripod to the central illumination connector on the lower part of the theodolite. The alidade thus remains freely rotatable and its operation is not impeded by cables. (Further information on the DM 502 are contained in brochure number 145.)





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Technical Specifications

Telescope magnification 30×
Objective aperture 1.8 in. (45 mm)
Shortest focusing distance 5.1 ft. (1.5 m)
Diameter of field of view at 1000 ft. (1km)
26 ft. (26 m)
Multiplication constant 100
Addition constant 0
Diameter of horizontal circle
3.5 in. (89 mm)
Diameter of vertical circle
2.8 in. (70 mm)
Circle reading, direct 6"/2 mgon
Circle reading, by estimation 3"/1 mgon
Sensitivity of alidade level 30"/2 mm
Centering range of compensator
± 20'/0.4 gon
Centering accuracy of compensator
3"/1 mgon
Focusing range of optical plummet
2.3 ft. (0.7 m) to ∞
Height of horizontal axis
6.7 in. (171 mm)
Weight of instrument 10.2 lbs. (4.6 kg)
Weight of carrying case 5.3 lbs. (2.4 kg)
Dimensions of carrying case
11.8×6.3×8.3 in. (30×16×21 cm)

Manufacturing Program

For more than 160 years Kern has manufactured surveying instruments and drawing equipment that have an outstanding reputation in all parts of the world.

The present manufacturing program includes:

Levels
Theodolites
Self-reducing tachymeters
Electro-optical distance meters
Optical precision plummets
Planetable equipment
Photogrammetric equipment
Compasses
Technical pens Prontograph
Lettering and drawing templates
Lenses for motion picture and still cameras
Optical instruments for military use
Special optical equipment

Ordering Data

Engineer's theodolite K1-M 400 gon or 360°, with upright telescope image
The instruments are supplied in a metal carrying case with adjusting tools

Accessories

Centering tripod No. 1925 with telescopic metal legs
Centering tripod No. 1915 with telescopic wooden legs
Electrical lighting consisting of: battery case, lighting fixture and mirror for reticule illumination
Diode circle illumination system
"Lux-Timer" with built-in exchangeable 9V battery
Eyepiece prisms
Eyepiece filter
Elbow eyepieces
Gauss autocollimation eyepiece
Pentagonal prism attachment 90°
Optical micrometer
Lens protection cap
Rubber sunshade tube
Tubular compass
Circular compass
Telescope level with coincidence prisms
Plumb bob with plumb line plug
Electro-optical distance meter DM 502
Optical roof and ground plummet
Extension tube for centering rod of the centering tripod
Traversing equipment PZ, consisting of: 2 targets in metal carrying case and 2 centering tripods No. 1925 or No. 1915
Invar subtense bar IB
Centering plate
Fungicide compound
Shoulder carrying strap
Transport rucksack
Packrack
Canvas bag for tripod
Padded shipping case

World-wide Kern Service

The proverbial reliability of Kern instruments is ensured by the dependable service offered by our foreign representatives. They maintain efficient repair facilities, staffed with factory-trained personnel and backed-up by an adequate supply of spare parts.

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