Kern SWISS

DKM 2A

One-Second Theodolite with Automatic Vertical Indexing

Now with Kern MULTIBASE

The centering system for every standard

DKM2-A An Outstanding Instrument

High measuring accuracy, simple operation and maximum stability under any environmental conditions, these are the design parameters on which the construction of the DKM2-A is based. The high resolution telescope produces a sharp image with maximum contrast. The digital readout virtually eliminates reading errors. Use of tempered steel for both vertical and horizontal axis as well as for all components influencing measurements, guarantees highest stability and imparts confidence when instrument is used under most adverse conditions.
At a high intrinsic accuracy, the DKM2-A is simple to operate: its digital readout is explicit. The operating knobs are in logical sequence and thus assure operating convenience. Both tangent screws are equipped with coarse- and fine drive, providing precise pointing. The automatic vertical compensator is simple in construction, it increases readout efficiency and precision of the vertical angle; the time consuming setting of a coincidence level is eliminated.

Application

The DKM2-A is a universal one-second theodolite for every demanding angle-measurement application.
An extremely wide range of accessories extends its field of applications:
Triangulation
Photogrammetric ground control
Deformation measurements
Traversing with the electronic distance meters DM504/DM550 or an invar-subtense bar
Precise layout for construction
Optical tooling measurements in industry with autocollimation (DKM2-AC) and Laser eyepiece
Astronomical observations

Digital Circle Readout

The readout for both horizontal and vertical circles appears simultaneously in the circle reading eyepiece. A glare-free readout is assured by a yellow-green filter, hence no tiring of the eye.
Essential for a one-second theodolite, the DKM2-A has the reliable Kern double-circle reading principle. The human eye is most sensitive for estimation of equal distances between two narrow vertical lines; thus the "symmetry-setting" system which has proven itself, is retained. The respective circle readout designated with "V" and "H", is accomplished with optimum accuracy, setting the single vertical line evenly between the double-lines.
All parts influencing the measuring accuracy are mounted on a steel plate in the immediate vicinity of the circle. The resulting answer, projected to the reading eyepiece by viewing optics is therefore undistorted. Up to and including the 10 second graduation, all values are read directly in digits. The tiring and error-producing reading of divisions or estimating of intervals, is eliminated. Only the single second must be read on the scale graduations.

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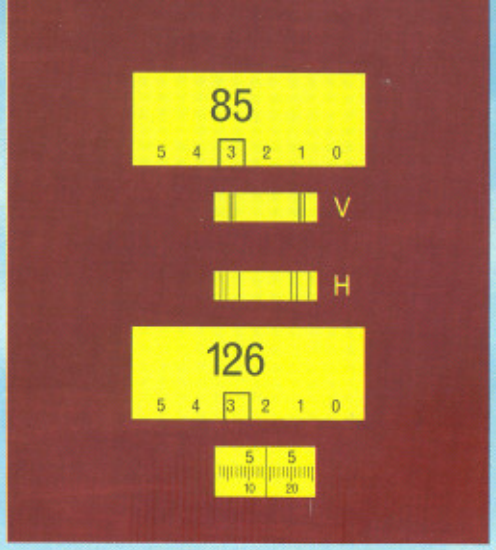
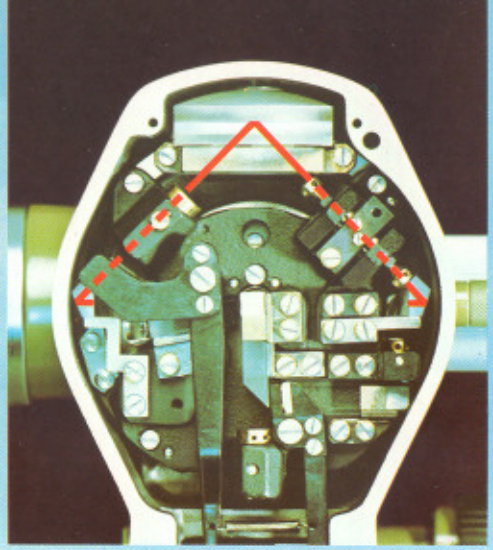




Coarse and Fine Drive for Circle Orientation

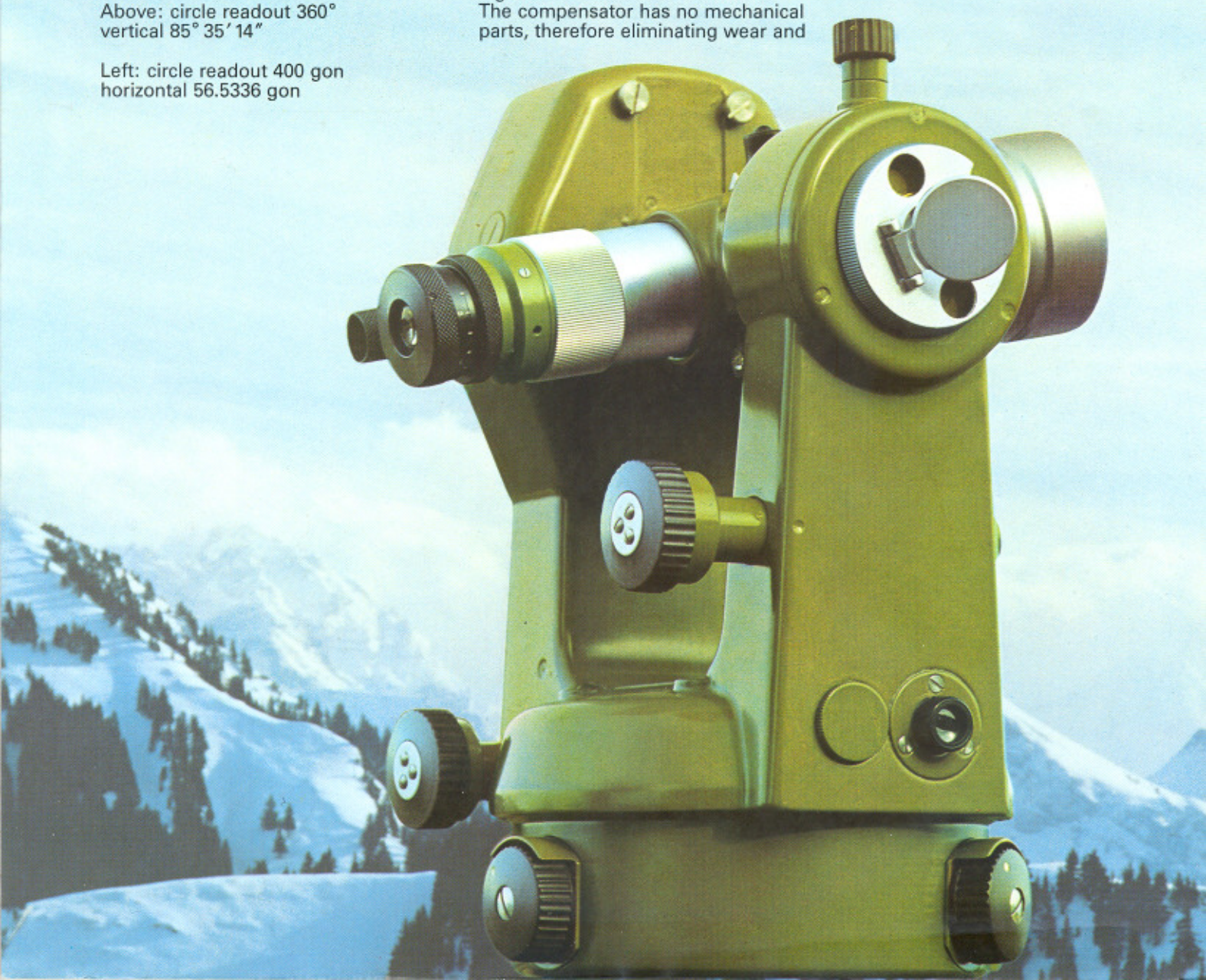
The horizontal circle is quickly rotated through 360° with the coarse drive and set easily and precisely to any desired value with the fine drive. Both drives are protected by a hinged cover against accidental operation.

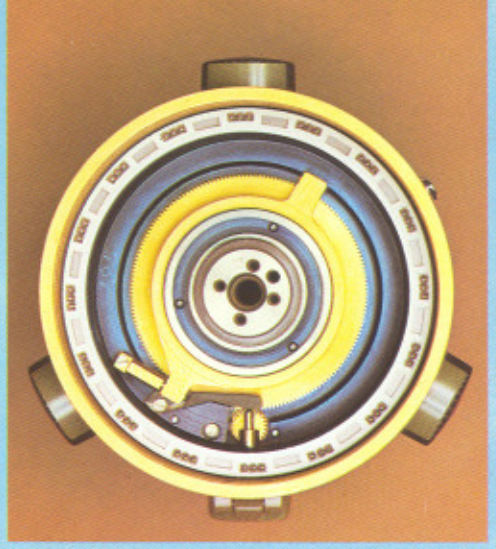
Above: circle readout 360°
vertical 85° 35′ 14″

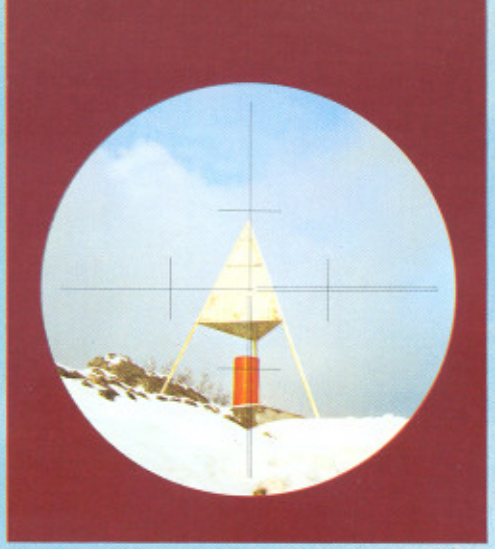
Left: circle readout 400 gon
horizontal 56.5336 gon

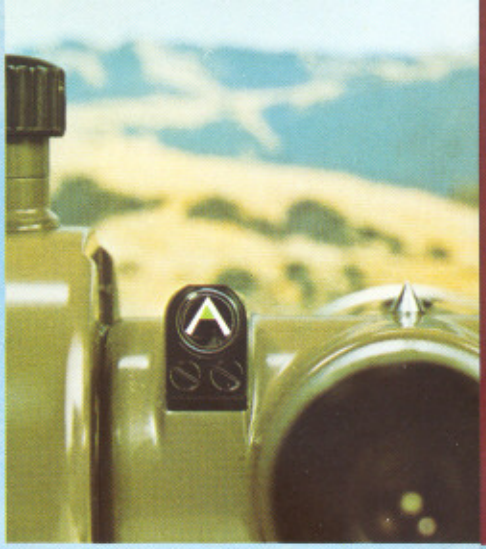
Maintenance-free Compensator

In place of a manually-set coincidence level, an ingenious automatic compensator eliminates the effect of vertical axis inclination.
The always true horizontal surface of a liquid serves as the compensation element. The path of rays between the two circle reading positions is totally reflected on the surface of the liquid and deflected by an angle corresponding to the vertical axis inclination.
The compensator has no mechanical parts, therefore eliminating wear and maintenance. It is insensitive to vibration and shock. The compensator displays highest possible accuracy and has excellent damping characteristics. The feature of automatic indexing has special significance when the DKM 2-A is used with the electronic distance meters: The observer can immediately read the vertical angle required for the reduction to horizontal distance, without having to center a sensitive level vial.









Telescope

An efficient telescope with 32× magnification and an excellent resolving power, produces a bright and high-contrast image. All optical parts are anti-reflex coated on both sides. The telescope is equipped with a standard reticule.

Finder-collimator

The bright finder-collimator is a convenient feature to "zero-in" on the target.

Optical Plummet

The DKM 2-A is equipped with an optical plummet. It is located in the alidade and can be self-checked and adjusted by alidade rotation. It has a focusing range from 0.7 m (2.2 ft.) to ∞.
With this feature accurate vertical centering is possible over raised or recessed points without the need for additional equipment. The optical plummet will also provide optimum precision for short-range precise centering with accuracy requirements better than ±0.5 mm, such as may be needed in some industrial applications.

Ball Bearing Vertical Axis and Steel Trunnion Axis

A precise steel ball bearing forms the very stable vertical axis and permits a compact design of the instrument base. This type of axis system has been used on precise Kern theodolites for decades. It is rugged, maintenance-free and reliable even under the influence of extreme temperatures.
The horizontal axis consists of a tempered, precisely ground steel cylinder, penetrating the telescope housing. The axis is guided by bearings with three running surfaces. This type of bearing has the well-known advantages of the V-type bearing. Additionally it reduces the wobble errors to a minimum and protects the axis against transportation hazards.

Two-speed Vertical and Horizontal Slow Motion Screws

A mechanical speed reduction is built into both tangent mechanisms. When pointing with the coarse drive, the telescope reticule intersect is moved slightly past the target. When retracting, the speed-reduction gear is automatically engaged, thus at the same rate of knob rotation, the rate of reticule movement is reduced to half speed. As a result, more precise pointing is achieved.

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.
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.

Combination with the DM 504/DM 550

The Kern DM 504/DM 550 electro-optical distance meters can be combined with the DKM 2-A, the K1-M and the K1-S engineer's theodolite. The distance meters 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, traversing or precise layout work. Even with the attached DM 504/DM 550, the telescope of the theodolite, can be plunged over the 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. The DM 504/DM 550 can bee combined with the interface DIF 41 and the HP-41 pocket calculator. (Further information on the DM 504 and DM 550 is contained in brochure No.127e.)

Combination with the HP-41 via the Kern DIF 41

The DIF 41 and the HP calculator employed are simply attached to the theodolite and connected by cable to the distance meter via the theodolite lighting fixture. The measured values are also automatically transfered to the DIF 41 and the HP-41 from the theodolite via the power supply equipment.
All the programs developed in the Kern SICORD System can be used together with the DKM 2-A. Beside the manual input of the angular values the distance will be automatically transfered.
The following programs are available:
Computing of horizontal distance and height difference corrected for influence of earth curvature and refraction
Point measurement and setout
Free stationing and error calculation
Storing and printing of datas.
(Detailed brochure No.113e, 114e, 115e)

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Technical Data
Telescope magnification 32×
Objective aperture 1.8 in. (45 mm)
Shortest focusing distance 4.9 ft. (1.5 m)
Diameter of field of view at 1000 ft. (1 km) 27 ft. (27 m)
Multiplication constant 100
Addition constant 0
Diameter of horizontal circle 3.2 in. (80 mm)
Diameter of vertical circle 2.9 in. (74 mm)
Circle reading, direct 0.1 mgon/1″
Circle reading, by estimation 0.05 mgon/0.1″
Sensitivity of plate level 20″/2 mm
Leveling range of compensator ±40 mgon/2′
Working accuracy of compensator < ±0.03 mgon/0.1″
Focusing range of optical plummet 2.3 ft. (0.7 m) — ∞
Height of horizontal axis 6.7 in. (171 mm)
Weight of instrument 13.7 lbs. (6.2 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)

Ordering data
One-second theodolite DKM 2-A
360° or 400 gon, with upright telescope image
One-second theodolite DKM 2-AC
360° or 400 gon, with bright-line auto-collimation eyepiece, inverted telescope image
One-second theodolite DKM 2-AM
360° or 400 gon, with trunnion axis micrometer
The instruments are supplied in a metal carrying case and adjusting tools.

Accessories
Centering tripod No.174B with wooden extension legs, heavy duty
Centering tripod No.1916 with wooden extension legs
Centering tripod No.1926 with metal extension legs
Electrical illumination, 3V or 6V, consisting of battery case, lighting fixture and mirror for reticule and plate level illumination, combinable with hand lamp
Eyepiece prisms
Eyepiece filters, green, black, orange
Elbow eyepieces
Autocollimation eyepiece, Gauss, bright field
Exchangeable eyepiece, magnification 19×
Laser equipment
Lens protection cap
Sunshade, rubber
Striding level
90°/100 gon Pentagonal prism attachment
Electro-optical distance meters DM 504/DM 550
Optical micrometer
Front lenses for short sights
Optical roof and ground plummet
Extension tube for centering rod of the centering tripod, 50 cm
Plumb bob, with plumb line plug
Traversing equipment PZ, consisting of 2 targets and 2 battery cases in metal carrying case and 2 centering tripods No.174B or No.1916
Invar subtense bar IB
Trivets
Centering plates
Plug-in targets
Distance reading index for measurements with invar tape
Fungicide compound
Desiccating compound
Shoulder carrying strap
Transport rucksack
Packrack
Canvas bag for tripod
Padded shipping container

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
Optical-mechanical and electronic theodolites
Reduction tachymeters
Electro-optical distance meters
Industrial measuring systems
Computer-aided systems for surveying and photogrammetry
Photogrammetric equipment
Lenses for motion pictures and still cameras
Binoculars
Optical instruments for military use
Special optical equipment

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.