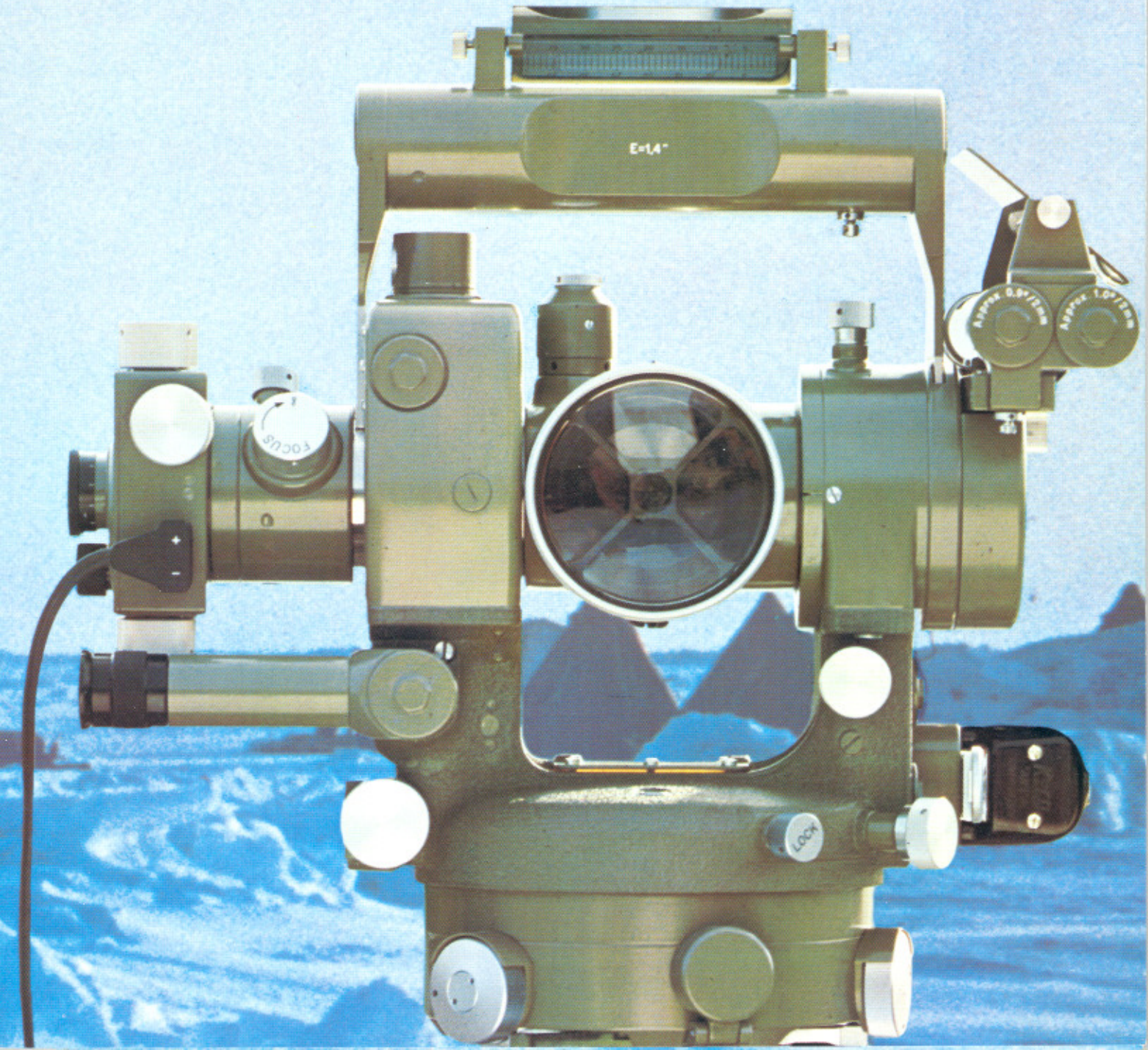
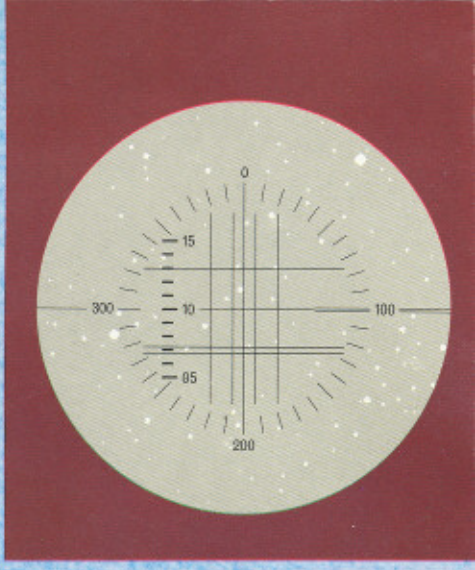
Kern SWISS

DKM 3A

Astronomical Universal Instrument



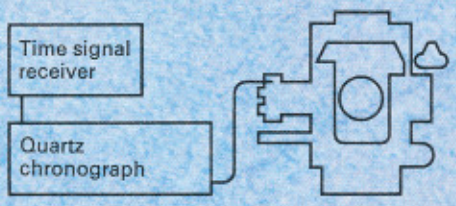


DKM 3-A World Renowned

The Kern DKM 3-A is an universal instrument of the highest precision which lends itself advantageously to astro-geodetic observations, particularly in difficult and inaccessible terrain, since it can be carried comfortably by only one person. The most outstanding features of the Kern DKM 3-A are: the very short mirror-lens telescope with its wide objective aperture and the well-proven ball bearing vertical axis system featuring smooth turning and minimal height. Due to its compact design, handiness and precision the Kern DKM 3-A proves itself the ideal instrument not only for general astro-geodetic work but also for instruction and research and is an indispensable tool for expeditions to any part of the world.

Application

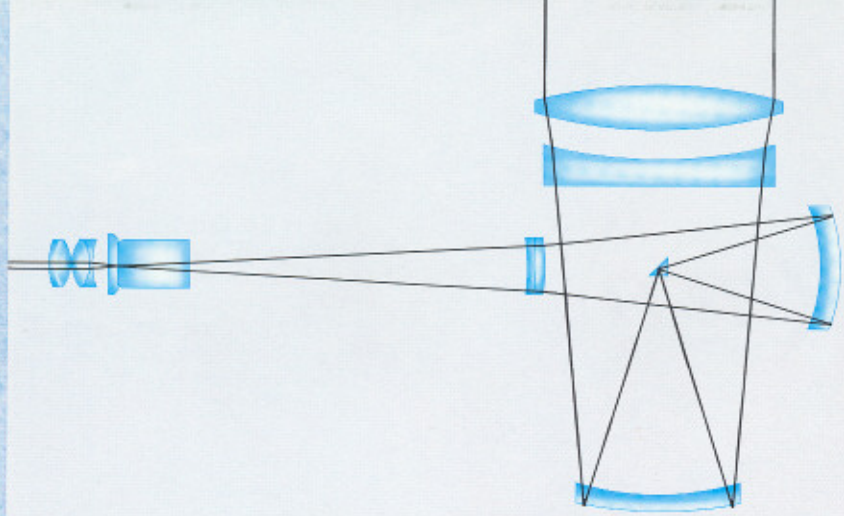
The Kern DKM 3-A fulfills all expectations of an astronomical universal theodolite. The efficient use of the DKM 3-A for all methods of astronomical determination of position, time and azimuth is assured by the use of appropriate accessories such as levels, lighting systems and time recording instruments. In order not to limit the

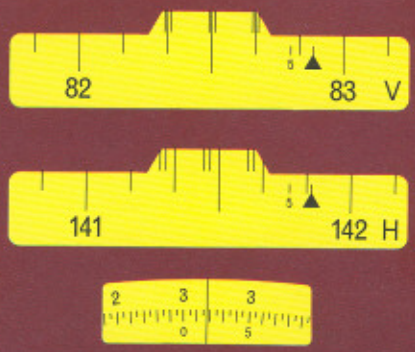


range of application of the Kern DKM 3-A to astronomical observations only, the theodolite has been equipped with a focusing telescope and an optical plummet. The instrument may be used in a forced centering mode and fitted with an autocollimation eyepiece on request. Therefore, the DKM 3-A can also be used for first and second order triangulation work, in space projects, missile tracking and in radio astronomy as well as special projects in industry. The eyepiece micrometer of the telescope then serves to measure very small angles with high precision and without using the circles.

Eyepiece and Recording Micrometer

The Kern DKM 3-A is equipped with an eyepiece and recording micrometer which can be rotated through 90° and thus can be used as impersonal micrometer either in zenith or azimuth direction. For continuous tracking of moving objects two sets of drive screws allow for zenithal as well as azimuthal movements and can be turned with either hand.





Telescope

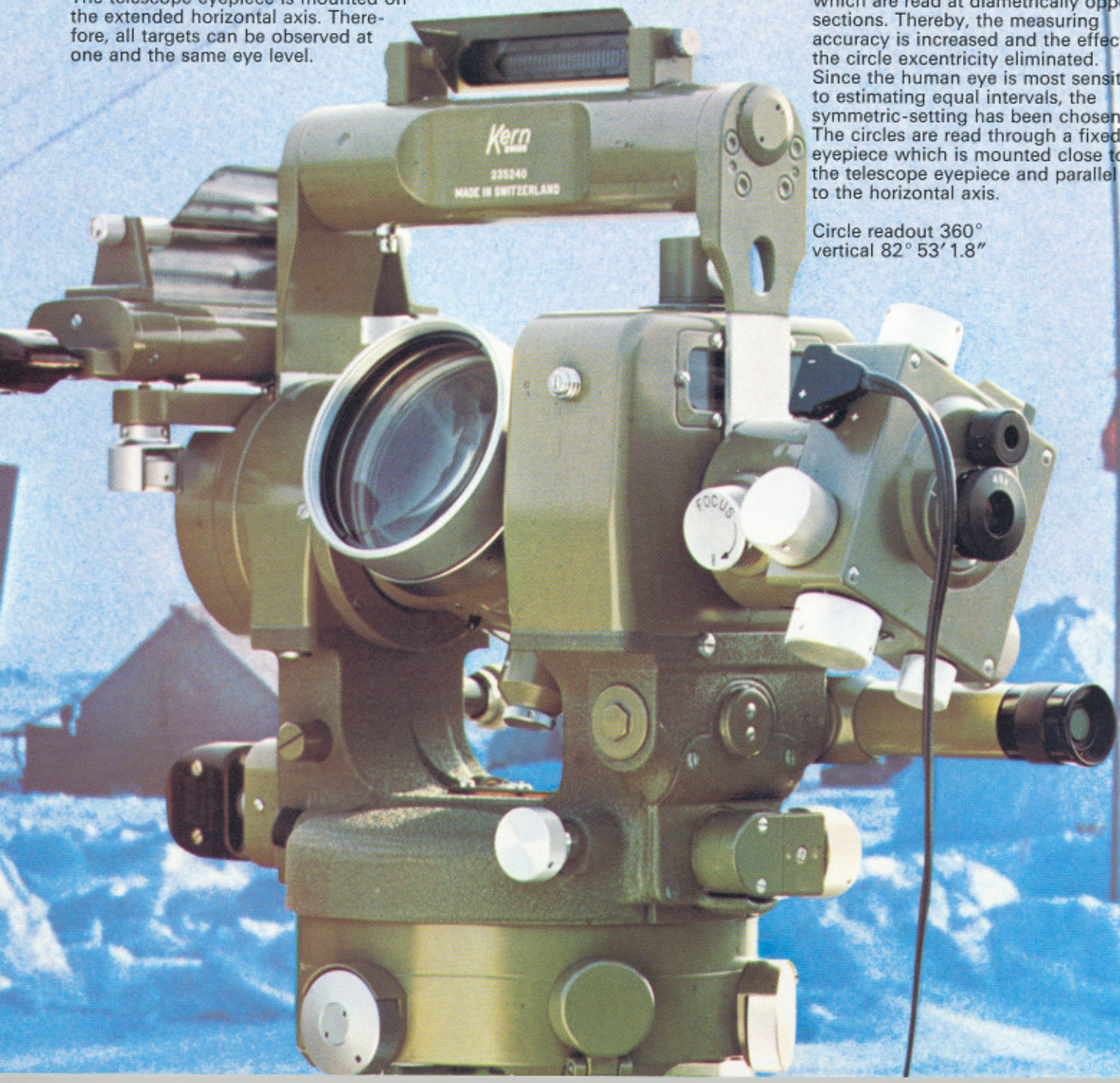
The mirror-lens telescope of the Kern DKM 3-A can be focused and satisfies the requirements of a short barrelled telescope with wide objective aperture, producing an erected, contrast-rich image without any spectral interference. The telescope eyepiece is mounted on the extended horizontal axis. Therefore, all targets can be observed at one and the same eye level.

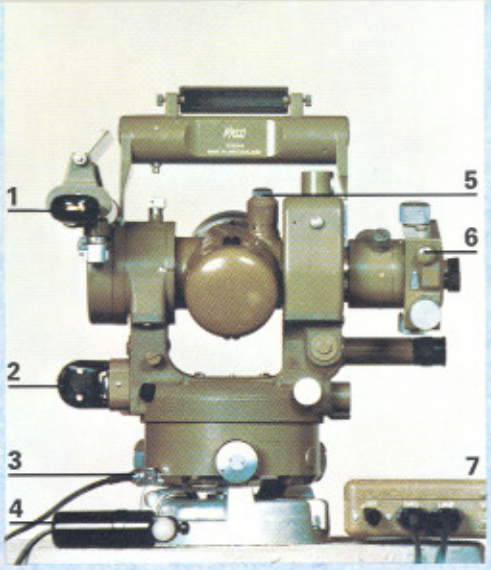
Due to its short dimensions the DKM 3-A telescope can be plunged even when the striding level is mounted. It is positioned in the center of the instrument and produces very bright images due to its 45× magnification. Therefore, even fainter stars can be included in the observation program.

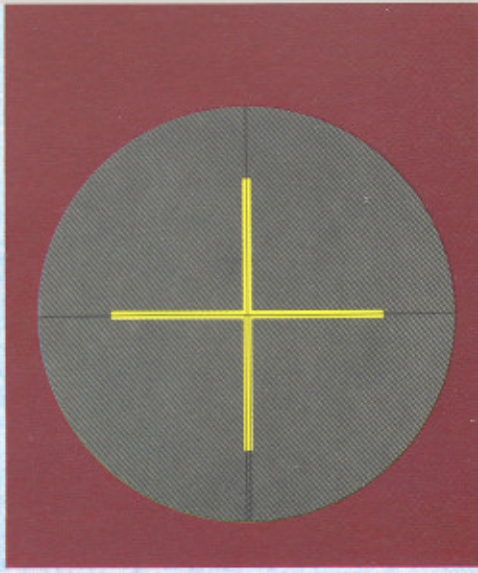
Circle Readout

The readout for both horizontal and vertical circle appears with their common micrometer scale simultaneously in the circle reading eyepiece. Vertical and horizontal circle have two concentric graduations (double circle), which are read at diametrically opposed sections. Thereby, the measuring accuracy is increased and the effect of the circle excentricity eliminated. Since the human eye is most sensitive to estimating equal intervals, the symmetric-setting has been chosen. The circles are read through a fixed eyepiece which is mounted close to the telescope eyepiece and parallel to the horizontal axis.

Circle readout 360°
vertical 82° 53′ 1.8″







Axes

Since decades the precision ball bearing system has proved its worth as vertical axis. It features an extraordinary high stability but yet permits a compact design. This system is very rugged, maintenance-free and reliable even at extreme temperatures.
The horizontal axis consists of two tempered, precisely ground steel trunnions rigidly attached to the telescope housing. The axis is supported by standard-mounted bearings and guided by three evenly spaced running surfaces. This arrangement provides the well-known advantages of the V-type bearing and, in addition, minimizes the tumbling errors and assures maximum protection during shipment.

Illumination System

Since most astronomical observations are performed during twilight or nighttime hours the Kern DKM 3-A has been equipped with electrical illumination for all vital readout and pointing devices. The electrical connector terminal (3) is located on the instrument base and connected by internal wiring to all points in need of illumination. Variable illumination for the Horrebow level (1), variable illumination for the vertical and horizontal circle readout (2), handlamp (4), variable illumination for the telescope reticule (5), variable illumination for the scale of the eyepiece micrometer (6) and illumination for the collimation level.
The battery case (7) contains eight 1.5V dry cells, voltage can be changed from 3V to 6V.

Autocollimation

By this optical method the projected image of a cross-mark (negative reticule) is reflected by a mirror at the target upon the reticule of the telescope. The method is used advantageously to measure small variations in direction and inclination. The autocollimation method is also well suited for precise control measurements or the transfer of elevation and azimuth angles as derived from astronomic observations. The required autocollimation eyepiece with beam splitter may be installed on the DKM 3-A either at the factory or one of the authorized Kern service facilities.

Trivets

Wherever geodetic or astronomic observations of high precision have to be achieved repeatedly, it is advantageous to use pillars as observation sites. These are very stable and trivets provide for appropriate instrument positioning.

Forced Centering

The Kern centering system offers clear advantages for all measurements requiring forced centering. All Kern instruments and accessories are freely interchangeable on centering tripods, trivets as well as centering plates by the flick of the hand without disturbing the proper centering.

Optical Plummet

The Kern DKM 3-A is equipped with an optical plummet built into the alidade so that its adjustment can be readily checked by alidade rotation.

Carrying Case

The DKM 3-A carrying case consists of one rugged metal container which also holds adjustment tools, the alternate eyepiece, a green eyepiece filter, an electrical connector plug and desiccant.
A rucksack or a packrack serves to carry the instrument effortlessly and safely over rugged mountainous terrain.

Kern
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Technical Data

Telescope magnification 45×
with alternate eyepiece 30×
Objective aperture 2.7 in. (68 mm)
Shortest focusing distance 16.4 ft. (5 m)
Field view 20 ft. (20 m) at 1000 ft. (1 km)
Eyepiece and recording micrometer:
Number of revolutions 10
1 revolution: 10 contacts = 100 drum units (d.u.)
1 drum unit ~ 1″
Width of contact 1 d.u.
Drum interval 0.5 d.u.
Diameter of horizontal circle 4.1 in. (104 mm)
Diameter of vertical circle 4.1 in. (104 mm)
Circle reading, direct 0.5″
Circle reading, by estimation 0.1″
Sensitivity of plate level 10″/2 mm
Sensitivity of collimation level 10″/2 mm
Height of horizontal axis 6.7 in. (170 mm)
Weight of instrument 31.3 lbs. (14.2 kg)
Weight of carrying case 8.6 lbs. (3.9 kg)
Dimensions of carrying case 13.8×7.1×11.4 in. (35×18×29 cm)

Ordering Data

DKM 3-A astronomical universal instrument, 360° with erect image. The instrument will be delivered in a metal carrying case with adjustment tools, alternate eyepiece 30×, green eyepiece filter, lighting fixture and desiccating compound.

Accessories
Centering tripod No. 174B with wooden extension legs
Centering tripod No. 174A with rigid wooden legs
Electrical illumination, 3V or 6V, including battery case and hand lamp (The telescope of the DKM 3-A has a built-in variable reticule illumination)
Autocollimation eyepiece with beam splitter for 6V illumination
Autocollimation mirror with 90° magnetic base
Striding level with chambered level vial 1.5–2.5″ with or without lucite rod
Striding level with chambered level vial 0.8–1.4″ with or without lucite rod
Double Horrebow level with chambered level vial 1.5–2.5″ with or without lucite rod
Double Horrebow level with chambered level vial 0.8–1.4″ with or without lucite rod
Front lens attachment for short sights
Optical roof and ground plummet
Extension rod for centering rod of centering tripod
Trivets
Centering plugs
Centering plate
Desiccant
Fungicide compound
Shoulder carrying strap
Rucksack
Packrack
Padded shipping container

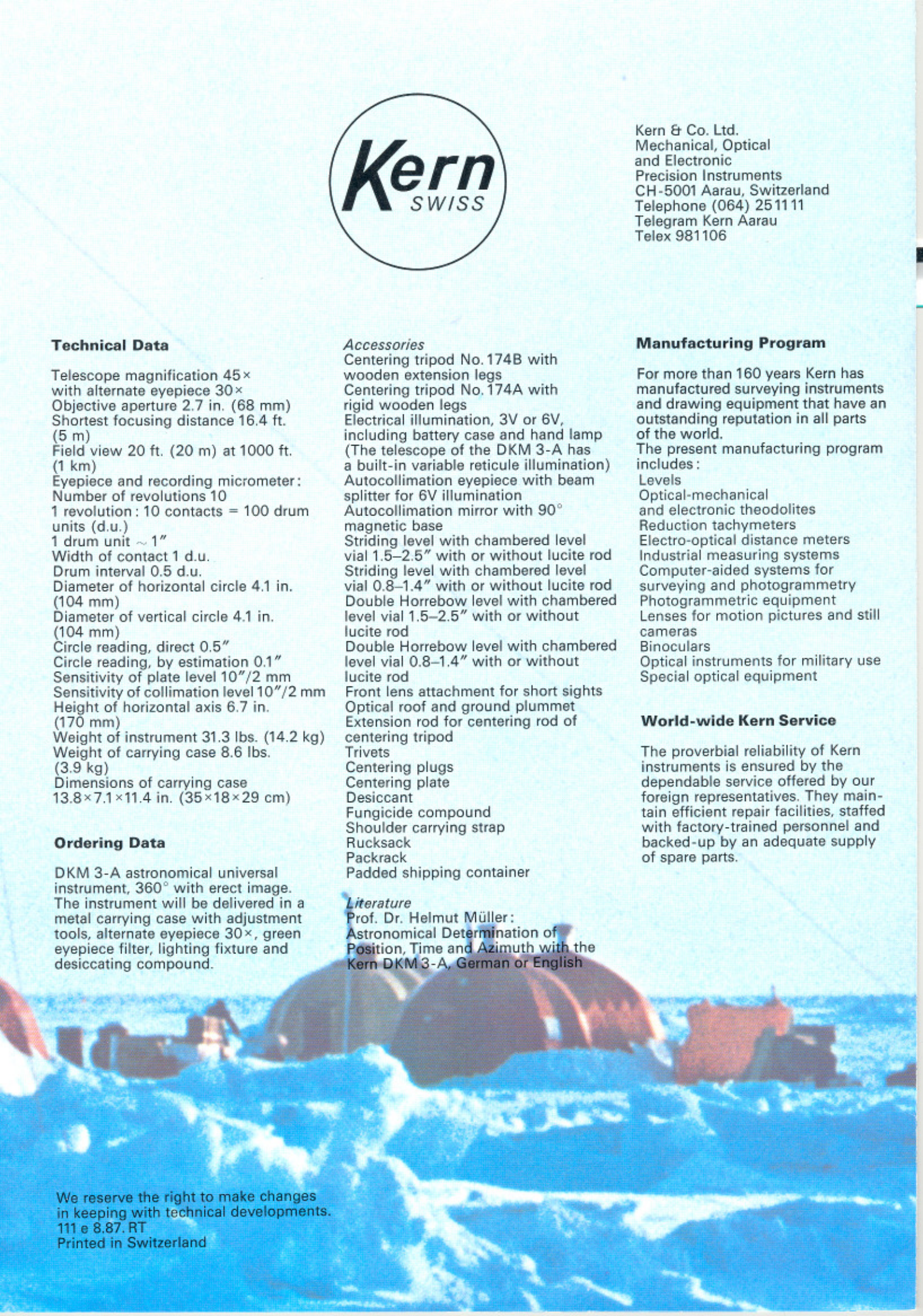
Literature
Prof. Dr. Helmut Müller:
Astronomical Determination of Position, Time and Azimuth with the Kern DKM 3-A, German or English

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.



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