Kenko Sky Memo Instructions

The Kenko Sky Memo ('R' version) is a singleaxis tracking system intended to be used in wide-angle astrophotographic applications. In the standard configuration, the system includes a dual-camera tracking arm, illuminated polar finder, and remote control paddle for guiding use. All components included with the basic tracker are pictured at right. An optional compact tripod with fine attitude and azimuth adjustments, or a counterweight bar with various weights are also available.





Initial Preparation

The Kenko Sky Memo requires 4 C-cells to be installed in the supplied battery holder, which is then plugged into the side of the tracker. Alkaline or carbon-zinc cells are recommended, but NiCd rechargeable cells may be used although the power light on the side of the tracker may not light. If you plan to photograph in cold weather, you should prepare an insulated enclosure for the battery pack to keep it warm enough to function. The operating time for most batteries are dramatically reduced below freezing.

Because the Kenko Sky Memo can be operated in either the northern or southern hemisphere, the switch labeled "Direction" must be set properly to the "N" or "S" position respectively.

The polar finder illuminator should also be inserted into the rear of the polar finder and plugged into the illuminator power socket on the tracker control panel.

Setting Up the Sky Memo Compact Tripod



The compact tripod is first assembled by spreading the legs apart and setting the tripod in the standing position. Loosen the joint screws at the top of each leg first, if necessary. The leg stabilization struts can then be brought together in the center where they should be held together by adding the accessory tray as shown in figure at left.

⁴ Next, attach the head of the tripod, with its flat plate, to the legs. A large black knob at the bottom of the head screws into the head through a hole in the top of the tripod. Make sure the azimuth adjustment tab mates with the

gap between the two azimuth adjustment screws. It may be necessary to loosen these knobs to widen the gap enough to allow the tab to fit in easily.

The Sky Memo tracker may then be placed on top of the compact tripod plate and screwed on using the provided thumbscrews. Secure the tracker on the mount tightly enough so that there is no play between the tripod and tracker.

Next, extend the mount legs and lock them in place. Tighten all joint screws to eliminate any play in the tripod joints.





The tracker is now ready to be placed in approximate tracking position. Find a level location with firm ground and a clear view of the polar region of your sky, and place the mount so that the polar finder is approximately lined up with the pole. Use a compass or geographical landmarks and knowledge of your latitude to do the initial setup if necessary. The purpose of this step is to line up well enough to place the necessary reference stars in the field of view of the polar finder.

After setting the tripod down in approximate position, fine adjustment of the altitude or azimuth is via a pair of adjustment knobs for each axis. These are located at the base of the head (near the top of the tripod). To adjust an axis, unscrew the knob in the direction opposite to the desired direction, then turn the other knob to move to the desired point. Once the desired point is reached, tighten the opposing knob to lock the mount in place.

Caution: Do not overtighten opposing knobs. The knobs are held onto the threaded adjustment rods with a setscrew and by threading onto the rod with a thread of opposing twist (left-handed screw). Overtightening a knob will likely cause the knob to be unscrewed from the adjustment knob. If this happens, loosen the knob's setscrew, screw the knob back onto the threaded rod until the end is reached, and tighten the setscrew to prevent it from moving further.

Continue setup in the "Camera Setup" section below.

Setting Up the Sky Memo on a Photographic Tripod

To use the Sky Memo tracker on a standard photographic tripod, the following tripod requirements should be satisfied:

- Good load capacity and stability
- Ability to rotate smoothly in azimuth and altitude
- Ability to lock the tripod position tightly

In general, a tripod of professional quality, such as a Bogen tripod, is necessary to satisfy these requirements. The ability to smoothly adjust the altitude and azimuth axes, and then solidly lock them in place is critical to achieving good polar alignment for tracking.

To attach the tracker body onto the photographic tripod, use the ¼-20 screw hole in the center of the bottom of the tracker. Most professional tripods also have an additional stabilization screw or metal post which can be extended into the holes provided for this purpose near the ¼-20 hole in the bottom of the tracker body.

With the tracker attached to the tripod, place the combined unit in the observing spot. This location should be level, on firm ground, and have a clear view of the polar region of the sky. To achieve the best stability possible, keep the mount as low to the ground as possible (i.e. do not fully extend legs) and spread the legs of the tripod as far out from the center as possible. Use any available additional material such as bags of sand or rocks around the tripod legs for additional bracing.

Adjust the tripod pointing to align the polar finder approximately with the pole. Use your knowledge of the polar constellations, a compass or geographical landmarks, and knowledge of your latitude if necessary. The purpose of this step is to line up well enough to place the necessary reference stars in the field of view of the polar finder.

Camera Setup

Once you have roughly aligned the tracker, place the camera tracker arm onto the polar axis with the clamp screws away from the tracker and tighten the clamp as shown at right. Mount your cameras to the brass ¼-20 screws at the end of the tracker arm. For flexibility in aiming each camera, the clamps at each end may be loosened to allow the cameras to rotate. Adding a ball-head between the tracker arm and camera for additional flexibility in aiming the camera is possible, but not advisable as gradual slipping often occurs with these types of heads.

If you are mounting a camera with a long telephoto lens on it, use a lens bracket (left) to move the attachment point closer to the center of balance for the camera and lens combination. Failure to do so may cause gradual slipping due to the weight of the heavy lens.

To balance the tracker arm on the RA axis, the heavier camera should be on the shorter side of the arm, which is designed to clear the top of the tracker body. Check balance by carefully loosening the tracker arm clamp. Perfect balance is not required. In fact, a slight imbalance to the east is actually best so that there is no possibility of any mis-tracking due to gear backlash.





To mount a single camera, one of the camera mount screws on the tracker arm maybe removed completely by unscrewing the clamping screw at the end of the arm. Once the camera mount screw has been removed, the optional counterweight and shaft may be screwed in place. Balance the camera by adjusting the weight up and down the shaft until the tracker arm is approximately in balance, but with a slight bias towards the east as mentioned previously.



Setting Up for a Shot

To set up for a shot, power up the Kenko tracker by connecting the battery pack to the connector on the side of the tracker body marked "Power." Plug the polar finder's illuminator into the socket marked "Light" on the side of the tracker body. If the illumination level is too low to see the reticle markings or too high to allow you to see the alignment stars, adjust it by turning the potentiometer marked "Vol." Use a small flat-bladed screwdriver to adjust this control. If the stars or reticle appear to be out of focus, turn the eyepiece of the polar finder until the stars and reticle are simultaneously in focus.

Position the tracker arm and rotate the cameras to cover the desired targets. Be sure to allow for rotation of the tracker arm during the exposure so that the cameras do not run into the tracker body. The arm rotates at the sidereal rate of 15 degrees per hour.

Once the cameras are aimed, perform a fine adjustment of the polar alignment using the procedure in the document "Kenko Polar Finder Instructions." To insure best results, verify the polar alignment of the tracker between each exposure.

The tracking accuracy you are able to achieve depends not only on accurate alignment of the mount, but also load weight and balance, aim point, atmospheric refraction (at lower altitudes), and other factors. However, as a guideline, the manufacturer-suggested maximum exposure times for unguided tracking for various focal lengths are:

Focal length (mm)	Max. exposure (minutes)
50	70
100	40
135	35
200	30
300	15

For long focal lengths and shots at low altitudes where atmospheric refraction affects tracking, a small guide scope should be used. In this case, the hand controller included with the Kenko mount should be plugged into the socket marked "Control" located on the side of the tracker body. The buttons on the hand controller increase the tracking rate to 2x sidereal rate or stop the motor, effectively giving a 2x forward or backward relative adjustment capability.

Specifications

Tracker:

Operation	Northern or Southern hemisphere (switchable by N-S switch)	
Weight	3kg (Mount plus camera arm)	
Dimensions	240mm long x 90mm wide x 130mm high	
Load capacity	2.5kg at each end. Total 5 kg.	
Attachment	M8 screws included for Kenko tripod or ¼-20	
	camera screw hole for standard photo tripod	
Polar scope	Magnification: 4X	
-	Actual field of view : 10 degrees	
	Accuracy: better than 5'	
	Illuminated reticle, northern and southern	
	hemisphere operation	
Polar scope filter thread	M30.5/P0.5	
Motor type	Stepper	
Gears	1:500, 1:2, Worm: 1:144	
Hand controller	2X or stopped	
Power	6VDC (4 c-cells)	
Battery life	>24 hours (Manganese batteries @ 20	
	degrees C)	

Optional Tripod:

Height	600 to 800 mm
Weight	4 kg
Load capacity	10 kg
Azimuth range	30 degrees
Altitude range	-10 degrees to 50 degrees

Troubleshooting

Below are some common problems encountered by photographers and some suggestions for troubleshooting a setup:

Backlash in RA	This is not problem. A little backlash is necessary for proper gear operation.	
Kenko tripod adjustment knob keeps turning without moving position	 The setscrew holding the knob has loosened. 	• Screw the knob back onto the adjustment shaft (it is a left-handed thread) until it reaches the end of travel and tighten the setscrew
Can't see reticle pattern well	• Polar scope is not focused.	• Adjust focusing by turning the eyepiece
	Illumination is too low	 Adjust illumination by turning the VOL control
Stars are trailed	 Clamp(s) not locked firmly 	 Tighten clamps and recheck before each exposure
	 Polar alignment is off 	• Check polar alignment before each shot
	Equipment flexure	 Watch balance when using longer and heavier telephoto lenses (use lens bracket).
	Atmospheric refraction	• Use a guide scope
	Battery power drops too low	• Check to insure that the motor is working properly, use fresh batteries, and keep batteries warm on cold nights
	Camera or lens moved	• Check equipment position before each shot to insure tracker clearance. The arm moves 15 degrees per hour.
Image is out of focus	 Focus ring moves during exposure 	 Use tape to keep the camera focus ring in position.
	 Film move moves against pressure plate in high temperature and humidity 	 Shorten exposure times Change to a different film Use dry air purge for the camera