

Preliminary

Appendix C

SUI™ KT Lens Options



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NOTICES

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1 OVERVIEW

The enclosed version of the SUI KT family of cameras is shipped with all of the needed hardware for operation. In most cases, your order will include a lens that requires installation. This document will provide you with lens information and installation instructions.

2 INSTALLATION OF C-MOUNT LENS

- 2.1 The enclosed KT camera is shipped with a threaded M42 cover to protect the focal plane array. Remove this cover by unscrewing it.
- 2.2 Shipped in the camera case will be an M42 to C-Mount adapter, part #1415-0213. Screw the M42 threads of this adapter into the M42 threads on the camera body until hand tight as shown in Figure 1.

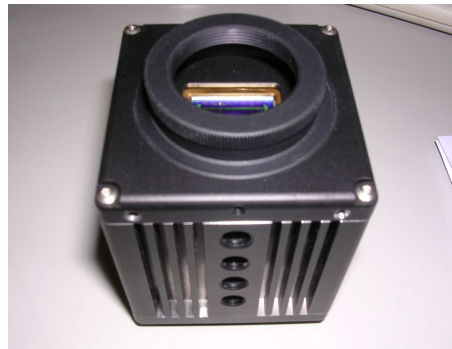


Figure 1. C-Mount lens adapter (p/n 1415-0213) mounted on enclosed KT camera

- 2.3 Screw the C-Mount lens onto the front of the lens adapter.

3 INSTALLATION OF SOLO 50 LENS

- 3.1 The SOLO 50 lens will be assembled as shown in Figure 2. The SOLO 50 lens requires that the M42 "KTS camera adapter" (p/n 1415-0470) is installed on your KT camera.
- 3.2 Remove the "KTS camera adapter" (shown in Figure 2) from the lens assembly and securely screw it onto the M42 thread located on the camera front face plate.
- 3.3 The "threaded lock nut" should still be attached to the "base 50 mm lens". Thread the "threaded lock nut" all the way onto the "base 50 mm lens" until it cannot be threaded farther onto the lens assembly.
- 3.4 Remove the lens cap and thread the lens assembly into the "KTS camera adapter" that is now attached to the camera body while acquiring data with the camera.
- 3.5 Once desired focus is achieved, thread the "threaded lock nut" toward the "KTS camera adapter" until it stops and the lens focal position is locked.

50mm KTS Camera Configuration

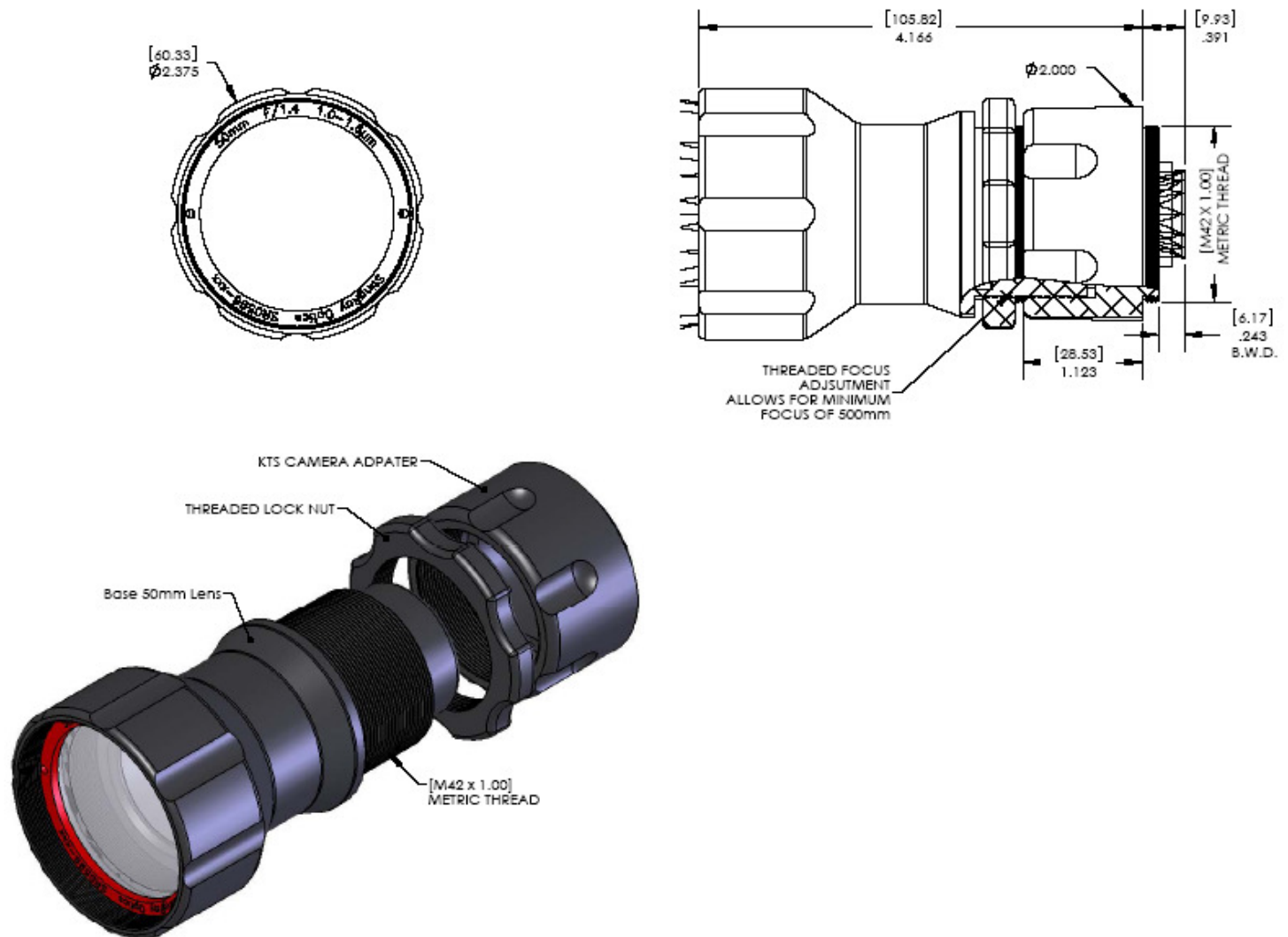


Figure 2. SOLO 50 lens mechanical specifications.

WARNING: When installing a SOLO 50 lens on a KT camera, be sure that the correct "KTS camera adapter" (part number 1415-0470) is used. The SDV camera platform SOLO 50 adapter (part number 1415-0469) should not be used on the KTS camera platform and can result in damage to the focal plane array.

4 INSTALLATION OF F-MOUNT LENS

Nikon F-Mount Lens Adapter

A Nikon type F lens adapter is available for KT camera platform as an accessory. The Nikon type F lens mount adapter allows popular 35 mm Single Lens Reflex (SLR) photographic lenses to be used. This lens adapter provides a mechanism to trim the focus position of the lens and for positioning the focus index markings on the lens at a convenient location for the user.

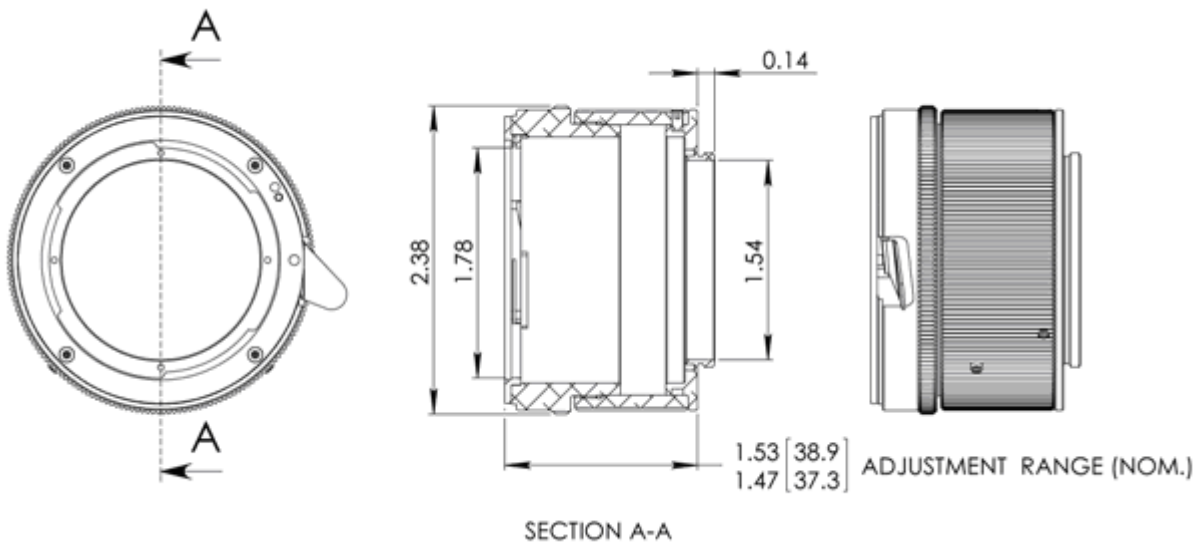


Figure 3. KT to Nikon F-mount lens adapter – part #8000-0194.

Note: The camera body should never be mechanically supported solely through the Nikon F-mount lens interface. The camera body weight should be mechanically supported using the provided tripod mounts or by some other direct mechanical attachment to the camera body.

Installation of Nikon F-Mount Lens and Adjustable Adapter

- 4.1 Choose a dust free environment in which to assemble the camera, lens adapter, and lens. Mount the camera on a tripod or equivalent holder that permits access to the lens adapter set screws all the way around the front of the camera.
- 4.2 Connect the camera's Camera Link interface to the computer which will be displaying the image output and/or connect the analog video output to a video display monitor.
- 4.3 Examine the distance markings on the lens. Provide for imaging a target at a distance within the range of the markings on the lens, preferably at a distance

from the camera front plate that matches one of the marked distances similar to that being used in the application. If possible, also set up a second target beyond the last distance marking on the lens to approximate infinity. The target should provide sufficient detail at the working distance to make it easy to judge relative focus.

- 4.4 Use a light source similar to that which will be used in the application (e.g., natural lighting, fluorescent, incandescent, or LED). Focus with a monochromatic light source will be sharper than with broad wavelength source.
- 4.5 Ensure that the lens adapter kit is the appropriate one for the lens to be used and that the lens mates properly with the adapter by temporarily putting them together.
- 4.6 Remove the camera's protective covering from the front plate and gently thread the adapter fully into the plate until the piece begins to seat. Using finger pressure on the outer rim of the M42 panel piece only (threaded piece shown in Figure 3), seat it firmly into the camera. If a two-point spanner wrench is available, remove the lens and look through the adapter from the lens side to see the four holes in the M42 panel piece that threads into the camera (see Figure 4). Adjust the spanner wrench to the spacing shown and firmly tighten the adapter to the camera using the wrench.

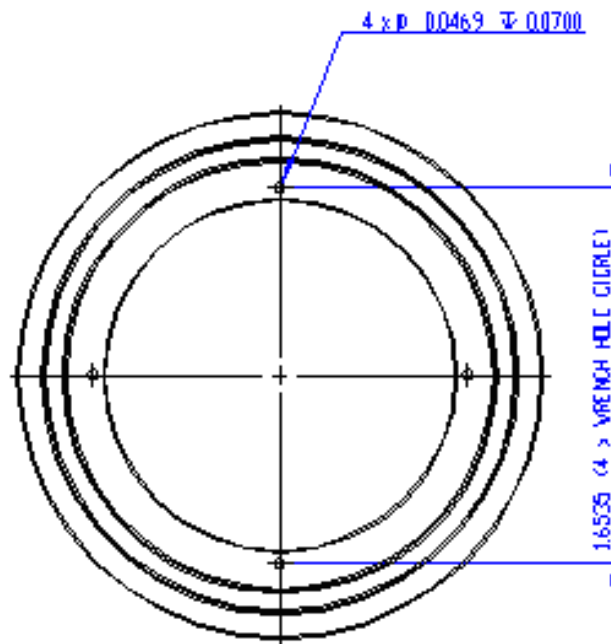


Figure 4. Drawing of adapter panel ring showing spanner holes.

- 4.7 Locate the set screws on the lens adapter barrel used for locking the rotation and focus adjustments. There are three rotation locking sets screws on the knurled collar ring closest to the camera plate set 120 degrees apart and two focus

adjustment locking set screws further away from the camera set 90 degrees apart. The set screws locations are shown in Figure 5.



Figure 5. Location of lens adapter focus and rotation adjustment set screws.

- 4.8 Loosen the three rotation locking set screws to permit rotation of the adapter and then position the pair of focus adjustments set screws where they can be easily accessed during the adjustment procedure. Gently tighten the three rotation adjustment set screws.
- 4.9 Loosen the focus adjustment pair of set screws to allow the lens and its mating piece to be rotated. This threads the combination into and out of the collar ring.
- 4.10 Position the lens focus ring to the lens focus marking that matches the distance of the target set up in the earlier step.
- 4.11 Check the lens aperture setting and open it up until the lens iris is at its maximum opening. This position is most sensitive to focus accuracy due to its relatively shallow depth of field.
- 4.12 View the image on the display and position the camera to put the target in the center of the view. If the light level is too high, reduce the sensitivity of the camera by changing its OPR setting or reduce the light level. If the light level is too dim, increase the camera sensitivity or the light level.
- 4.13 Next carefully rotate the lens interface to thread the lens further in while noting whether the focus is improving or getting worse (avoid changing the lens focus position). Continue or change direction until the image passes through its sharpest point and begins to soften again. If you use the targets at the end of this section and you are using the *SUI Image Analysis* program to operate the camera, it is useful to set the program's *ROI Measurement Window* to the *Line Profile* tab, with the *Line Selection* set to *Row*. Position the image display's yellow cursor so that it cuts across the black and white squares of the target.

Then monitor the peak-to-peak variation of the line profile as you adjust focus. The largest amplitude marks the best focus.

- 4.14 Return to the sharpest position, and then check the lens focus marking to ensure that it is correctly positioned.
- 4.15 If an alternate target distance is available, shift the camera to view that target and verify the result. Be sure that a satisfactory focus can be achieved at the distant target. It may be necessary to compromise the adapter focus adjustment to give the best average lens marking accuracy between the two points.
- 4.16 When satisfied with the adjustment, tighten the focus adjustment set screws (the pair closer to the lens). A torque range of 1-2 in-lbs is recommended for these set screws.
- 4.17 Loosen the rotation adjustment set screws (3) and rotate the lens adapter collar ring to reposition the lens focus markings to a position that will be useful when the camera is installed in its normal application. For tripod use with the operator above the camera, this is with the lens markings on top.
- 4.18 Retighten the rotation adjustment set screws. A torque range of 1-2 in-lbs is recommended for these set screws.
- 4.19 Remove the lens and look through the lens adapter to inspect the surface of the focal plane array. If any dust appears on the array window, follow the instructions of section 1.5 to clean the window.

5 LOCKING THE LENS MOUNT (OPTIONAL)

Included with each camera is a 2-56 Nylon tip set screw of 1/8 inch length and a hex wrench. It is recommended to install the nylon tip set screw firmly into the supplied lens adapter mount to secure the lens adapter and to minimize possible light leaks (see Figure 6).



Figure 6. Locking set screw and wrench for securing lens adapter.