

Night Vision Systems



OPERATING AND MAINTENANCE MANUAL

CORONAFINDER UV VIEWER

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1.0 GENERAL DESCRIPTION

The CoronaFinder is a battery powered, handheld direct view imaging system. It consists of a housing, lens-coupled intensifier, C-mount adapter, ultraviolet lens, two filters, eyepiece, handle and a weatherproof carrying case. Power is supplied by two AA batteries. The intensifier is a Generation II photocathode powered by a wrap-around high voltage power supply.

2.0 OPTIONS

There are many add-on options available for purchase with the CoronaFinder such as a CCD camera, digital camera, camera mounting plate, additional filters, or tripod.

3.0 SYSTEM SPECIFICATION

3.1 VIEWER CONFIGURATION

Lens coupled, image intensified viewer

3.2 IMAGE INTENSIFIER

TYPE: Photonis Generation II

SPECTRAL SENSITIVITY: UV-Visible-Near IR

LUMINOUS GAIN (White Light): minimum 10,000

PHOSPHOR: P-43

3.3 LENS

TYPE: 78mm, F/3.8 quartz

MOUNT: C-mount in, 49mm filter ring

3.4 FILTERS

TYPE: ultraviolet

THREAD: 49mm

3.5 PHYSICAL

SIZE/WEIGHT: 241mm x 64mm x 191mm, 1.14 kg

9.5"L x 2.5"W x 7.5"H, 2.5 lb.

9.5"L x 2.5"W x 3.0"H (without handle)

3.6 POWER

ON/OFF switch powered by 2 AA batteries

3.7 ENVIRONMENTAL

VIEWER STORAGE TEMPERATURE: -60°C to +70°C
VIEWER OPERATING TEMPERATURE: -10°C to +50°C
VIEWER Shock/Vibration: 25 g's, all axes

4.0 VIEWER OPERATION

4.1 SETUP

1. Make sure the ultraviolet lens and a filter are attached to the CoronaFinder.

*******CAUTION: DO NOT OPERATE THE VIEWER*****
UNLESS THE LENS AND FILTER ARE ATTACHED!**

2. Start out with the lens closed to the smallest aperture, F/16.
(F/16 = smallest aperture, F/3.8 = biggest aperture)
3. Turn the viewer power switch to the “on” position.

4.2 FOCUSING

1. Focus the lens as needed by turning the knurled (bumpy) section of the lens until the object is in focus.
2. Focus the eyepiece as needed, turning until the object is in focus for your eyes. The eyepiece adjustment will vary, depending on the user's eyesight.

4.3 EXCESSIVE LIGHT WARNING

*****DO NOT EXPOSE THE VIEWER TO LIGHT LEVELS***
GREATER THAN 0.01 LUX FOR MORE THAN A FEW SECONDS**

Excessive light levels will shorten the life of the intensifier and/or damage the intensifier permanently. Never turn on the CoronaFinder unless the ultraviolet lens and filter are attached!

4.4 BATTERY REPLACEMENT

The viewer is powered by two AA alkaline batteries. To replace the batteries, remove the viewer handle by unscrewing the big screw on the underside of the viewer. Unscrew the silver knob below the lens to reveal the battery compartment. Remove the batteries and replace with new ones, matching the polarity as indicated on the blue label. Then screw the battery compartment cover back on, and re-attach the handle.

4.5 CHANGING FILTERS

*******CAUTION: MAKE SURE THE POWER IS OFF*****
BEFORE REMOVING THE FILTER!**

To swap filters, simply unscrew the filter housing on the UV lens and screw in a different one (see pictures).

1. Remove filter, as shown below.



2. Attach new filter, as shown below.



4.6 TRIPOD USE

Remove the viewer handle by unscrewing the big screw on the underside of the viewer. On the underside of the viewer is a ¼-20 mounting hole that may be used to mount the viewer to any tripod.

5.0 DISASSEMBLY

Do not disassemble the intensified section. This section should only be disassembled/repared by Syntronics.

WARRANTY

Syntronics, LLC, warrants the equipment to be manufactured free from defects in material or workmanship. Any part or parts will be repaired or replaced when proven by Syntronics' examination to have been defective within one year from the date of acceptance by the original purchaser. All warranty repairs will be performed by Syntronics or as otherwise authorized by Syntronics in writing.

Shipping charges must be prepaid by the purchaser.

This warranty does not extend to Syntronics equipment subjected to misuse, accident, or improper application, nor repaired or altered by other than Syntronics or those authorized by Syntronics in writing.

This warranty is in lieu of all other warranties expressed or implied. Syntronics shall not be responsible for collateral or consequential damages.

No equipment shall be returned to Syntronics without return authorization by Syntronics.

ADDENDUM (ATTACHING A DIGITAL CAMERA)

1. Remove eyecup, first peel one edge, then pull away from the eyepiece.



2. ScopeTronix AdaptaView should be attached to front of camera.



3. Make sure camera lens is set to manual focus (MF).



4. Set the focus to infinity (∞).



5. Attach the CoronaFinder into the AdaptaView, making the bottom half enter first. Do not loosen the bottom two screws.



6. Tighten the top thumbscrew until the camera is secure.



7. CoronaFinder with camera



Note: Since the camera is now on “manual focus”, the focus ring on the eyepiece might need to be adjusted for best possible focus. Also, once the camera is attached to the CoronaFinder, the lens manual focus ring can be rotated slightly to change focus.

ADDENDUM (CORONA FILTER #1 & #4)

INTRODUCTION

The CoronaFinder is extremely easy to use. The CoronaFinder is supplied with two filters, Corona Filter #1 and Corona Filter #4. The CoronaFinder must **NEVER** be operated without one of the Corona Filters installed. Although either Corona Filter may be used, the following will give some guidelines about when to use #1 or #4.

WHAT IS CORONA

Corona discharge is a luminous partial discharge from conductors and insulators due to ionization of the air, where the electrical field exceeds a critical value. A high local electric field ionizes the air and causes a partial discharge. This process causes the excitation and breakdown of Nitrogen molecules, leading to emission of UV radiation. Some molecules are not ionized but excited – emitting photons on relaxation. Buildup of ionization occurs only if the electrons are going fast enough, i.e. if the electric field exceeds a critical value.

Thus a problem or defect in a component creating a local high electric field will show corona activity. This defect may be a sharp edge or point on a conductor. It may be a discontinuity on a bare cable (dirt or broken strand). It could be a nick, break or contaminant on an insulator, or a thinned area on a dielectric coating. It could be caused by a cracked, chipped or dirty bushing. Or it may be loss of insulator caused by a SF6 leak.

Utilities are typically made aware of corona by complaints of faulty radio or television signals. Because corona is invisible in daylight with the naked eye, maintenance crews will investigate by aiming devices such as a corona camera or radio antenna at suspected areas, and track corona.

EFFECTS OF CORONA

Corona has many damaging and environmental disturbing effects. One of these is the generation of corrosive materials, like ozone and nitrogen oxides. These combine with water vapor under conditions of high humidity to form nitric acid. This very corrosive material can shorten the lifespan of high voltage lines and substation components. Corona causes damage to high voltage insulators, especially non-ceramic (NCI) insulators. Corona can cause radio interference (RI/RFI) mainly to AM transmissions. Corona can cause audio noise; humming, sizzling and crackling sounds.

DETECTING CORONA

Corona generates very little heat and therefore is not detectable with thermal cameras. The corona discharge emits radiation in the 280nm-405nm spectral range, mostly in the ultraviolet (UV) and therefore is invisible to the human eye, though relatively weak emission at about 400 nm might be observed at night under conditions of absolute darkness. The corona emission in the 280nm-405nm spectral range cannot be detected during daytime due to the large amount of natural solar radiation. The CoronaFinder can only be effectively used outdoors at night time or can be used indoors, with or without the room lights on.

USING CORONA FILTERS

Both filters can be used indoors or outdoors, under all conditions. Both filters are equally useful, but usually under different conditions. An experienced operator will quickly learn which filter works best under a variety of lighting and searching conditions.

Corona Filter #1 is a very broad spectrum bandpass UV filter. It passes the entire corona spectrum from deep UV to visible. It has a peak transmission of about 80% in the middle of its passband. It also passes a small amount in the near IR.

Corona Filter #4 is a very narrow bandpass UV filter. It only passes a narrow section in the middle of the corona spectrum. It has a peak transmission of about 35-40%. It does not pass any in the visible or the near IR.

Corona Filter #1 passes light in the UV and the near IR part of the spectrum. This allows the operator to see the corona and some of the equipment surrounding the corona. This makes it easier for the operator to pinpoint the exact cause and location of the corona. Since Corona Filter #1 also passes some of the light in the near IR, a few bright shiny objects may falsely appear to be emitting corona. Some of these can be eliminated by dimming the lights or by viewing from a different angle. Light reflections will move or change intensity depending on viewing angle, but actual corona emission will not move.

Corona filter #4 only passes light in the UV part of the spectrum. This allows the operator to have maximum contrast and minimum false detections of corona. This has the disadvantage in that it is more difficult to pinpoint the exact location of the corona. One may be able to see the corona but still cannot tell exactly where it is. With practice the operator will be able to view the corona, and then lift the CoronaFinder to see the location.

Since Corona Filter #1 has a higher peak transmission and a wider passband than Corona Filter #4; it will always be able to detect lower levels of corona than Corona Filter #4. To achieve maximum sensitivity and minimum false detections the room lights may need to be dimmed when using Corona Filter #1.

Corona Filter #4 is fairly insensitive to room lighting.

The amount of room lighting and the quantity of corona will influence which filter will work better