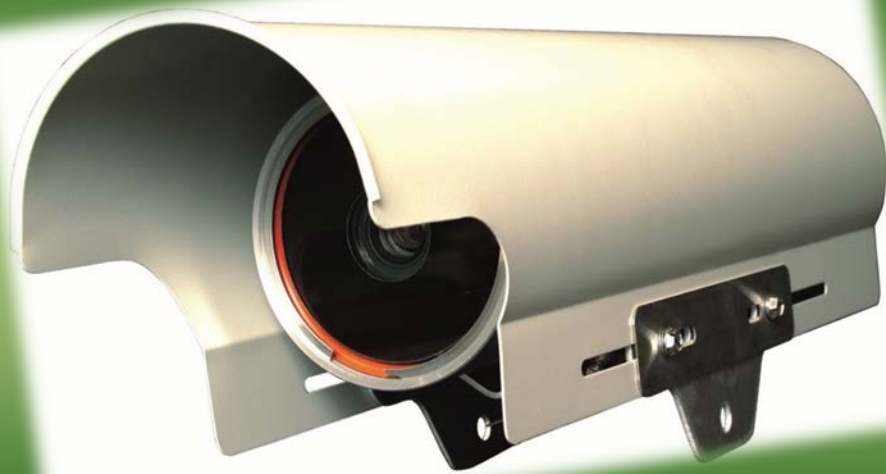


Vantage[®]

Camera User Guide



iteris[®]

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1. INTRODUCTION

The Vantage RZ4 Series of cameras offers the best all-round performance for the capture of vehicles in a variety of lighting and weather conditions. Most video detection systems require a clean and stable video signal to function correctly. In contrast to other CCTV type cameras, the Vantage camera delivers a constant and regulated video signal that is easily processed by the Vantage video detection systems.

The camera assembly is sealed in a weather-resistant enclosure specifically designed for outdoor use. To prevent sun glare and to protect the housing from the weather elements, the camera is fitted with a moveable sunshield to allow the camera to be pointed in any direction. The sunshield also extends beyond the front of the camera housing to protect the housing glass from rain and the formation of icicles that could hinder the view of the camera.

The camera housing incorporates an adjustable mounting bracket that allows the camera to be positioned correctly. The mounting bracket is pre-drilled for easy attachment to a variety of poles and other street fixtures simplifying installation and set up.

The camera is virtually maintenance-free with no active moving parts. To prevent the build up of condensation and ice on the lens glass, the camera housing is fitted with a heater that ensures a clear view at all times.

The Vantage Camera has been optimized for use in outdoor conditions specifically for the viewing of traffic flows at the intersection, on the highway, on bridges or in tunnels. The camera's image is normally adjusted to view up to 4 or 5 lanes of traffic.

The RZ4-Advanced™ our new premium camera offering that provides for streamlined installation by eliminating the Amphenol and BNC connectors; only wire stripping tools and a screw driver are needed to install and terminate the camera cables. A coax cable stripper with a brown insert should be used to simplify the coax cable preparation. The RZ4-Advanced camera is backward compatible with existing camera installations in the field. Simply cut the existing cables and connectors, strip the power and coax cables, and terminate with a standard screwdriver to the back of the new RZ4-Advanced camera. The RZ4-Advanced camera also gives technicians the option to set up the Field Of View (FOV) from the bucket truck or on the ground at the cabinet. Technicians can use Iteris' Lens Adjustment Module (Advanced LAM or LAMVIEW). The RZ4- Advanced™ FOV can be set up and configured from the ground.

Benefits

- Specifically designed for vehicle detection applications
- Optimized to work with Iteris' advanced detection algorithms
- Quick-click connectors and adjustable camera mount streamline installation and minimize setup time – no crimping tools required!
- Set up and configure at the camera or from the ground
- Cable termination located at the rear of the camera simplifies cable connection
- Advanced heater enables optimal video detection performance in adverse weather conditions.

Features

- Color or monochrome image sensors available
- Latest CCD sensing element and DSP technology
- Electronic shutter and auto iris lens
- Auto focus with manual override
- Camera Housing
- Sealed housing to IP67 specification
- Integrated adjustable sunshield
- Auto-sensing power supply – 115/240 VAC 50/60 Hz
- Internal heater with proportional power control
- Integrated mounting bracket
- Separate connectors for power and video

1.1 Overview

A typical intersection setup will have four cameras, each connected to a Vantage Edge2 processor module in the traffic control cabinet. You use the firmware on the Vantage Edge2 processor module to draw detection zones on the camera's video image. To define a detection zone, you designate the four corners of a zone on the video picture and then setup the various zone properties. You can define up to 24 detection zones per camera view.

The processor module analyzes the camera image to determine when a vehicle is present in a zone. Vehicle detection information is passed to the traffic control equipment for real-time adaptive control. Video can also be sent via by various communication methods to be displayed and monitored at a traffic management center.

This User Guide will walk you through the installation, setup, and startup of the Vantage range of RZ4 cameras. Please refer to the Vantage Edge2 manual for full instructions on the installation and setup of the processor.

If you have questions once you have completed the steps within this guide, refer to [Section 4: Troubleshooting/FAQs](#) or contact product support using the number listed in [Section 7: Product Support](#).

1.2 Tools and Equipment

Iteris Supplied Parts

The following items come supplied with the Vantage Camera:

- Phoenix 3 pin Connector
- Amphenol 31-321-1012 BNC connector (one per camera)
- Video surge suppression (supplied with Edge2 processor)
- 6' (1.8meter) coax cable (supplied with Edge2 processor)

Customer Supplied Parts

The following items should be supplied by the customer/installer of the system:

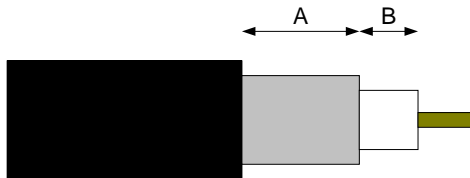
- Coax Cable (Belden 8281)
- Green 12 AWG wire (for grounding the video surge suppressor)
- ½" or ¾" stainless steel banding material
- Three-conductor, 16 AWG power cable Cord grip or other watertight fitting

Important: Please refer to **Section 6: TECHNICAL INFORMATION** for information on the correct type of power and coax cable to use. Failure to use the correct cable may result in poor performance or a non-working system.

Tools Required for Installation

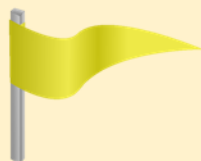
The following tools are required for installation of the Edge2 processor:

- Coax Crimping Tool
 - Ideal Industries 30-483 coax crimping tool and die set.
 - Ferrule .324", Center Pin .068"
- Coax Stripping tool
 - Ideal Industries 45-521 coax stripping tool
 - Brown Cartridge: Shield A .328", Dielectric B .109"



- Banding tool
- 9/16" and 3/4" wrench
- Socket wrenches
- Screwdrivers
- Wire cutters and wire strippers
- Cable cutter
- Two-way communication equipment (optional)

- Bucket truck
- Video monitor/patch cable
- Vantage Lens Adjustment Module
- Volt/Ohmmeter



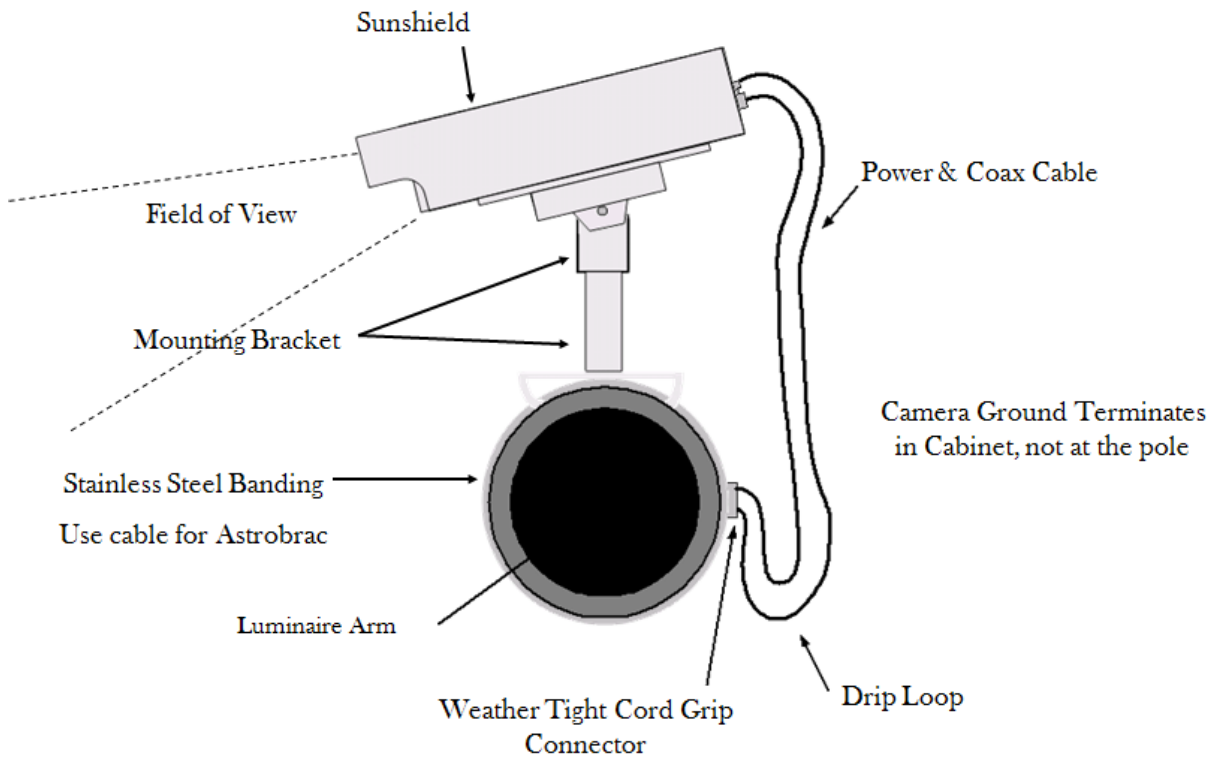
Important

A/C power for the camera must be supplied from either a fused source or via a circuit breaker

2. Camera Installation

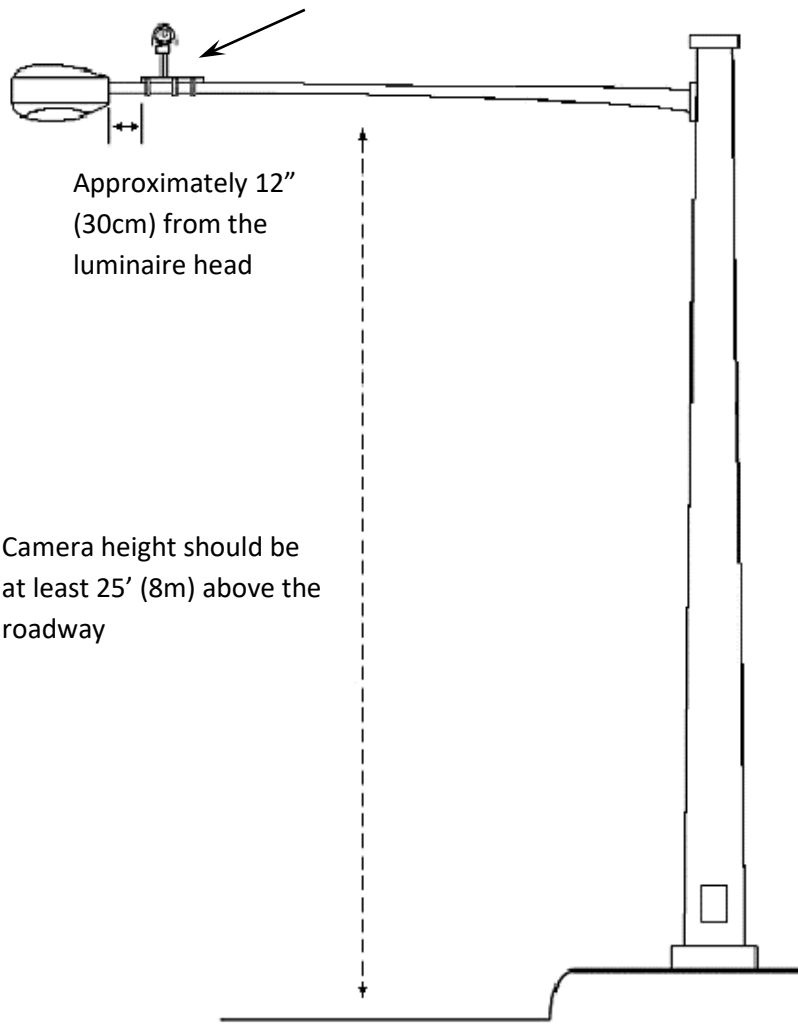
2.1 Camera Mounting

The physical camera mounting is done using a camera bracket that is banded to the luminaire arm or can be mounted on the mast arm using a suitable extension bracket.



One possible camera mounting location is up on the luminaire arm centered over the field of view, however, it is not always possible to use this mounting. Camera mounting is critical to providing the proper field of view, something that will be discussed in detail in the next section.

Possible Camera
Mounting Location



Mast Arm Mounting with Pelco Bracket

✓ **Note:** If the luminaire arm is too short to center the camera over the field of view, especially on wide roadways, then an extension bracket on the mast arm may be the better choice. Centering the camera is just as important as gaining camera height. The mast arm mounting would end up with a camera height of about 25 feet when using a 6 foot extension bracket.

✓ **Note:** See the [Section 6: Technical Information](#) for more information on camera brackets.

2.2 Camera Video and Power Cable Installation

This procedure describes how to install the coaxial and power cables between the camera mounting location and the traffic control cabinet. If you are installing multiple cameras, perform the procedure for each camera.

The procedure is divided into the following parts:

- a. Running the cables
- b. Grounding the camera
- c. Preparing the coaxial and power cable connectors at the camera
- d. Preparing the coaxial and power cable connections at the cabinet

Running the Cables

Run one continuous pull (without splices) of coaxial cable and power cable between the camera mounting location and the traffic control cabinet. The cables need to meet the following specifications:

- Belden 8281 coaxial cable
- Three-conductor, 16 AWG power cable

 **Note:** See the [Section 6: Technical Information](#) for more information on cable specifications.

If you are installing multiple cameras at the location, label the camera locations and cables. The following table shows a suggested numbering scheme for a location with four cameras.

Cable	Camera	Phases
1	Camera 1	2, 5
2	Camera 2	4, 7
3	Camera 3	6, 1
4	Camera 4	8, 3

Cable and Camera Numbering

2.3 Camera Grounding

In order to successfully deter these transient voltage threats, your equipment’s input circuitry has incorporated devices that will divert harmful voltage and current above a safe limit to ground while letting the normal signal to go through. Since this transient current can be very high for a short time, an effective (lowest resistance) path to ground is essential to the survival of the product.

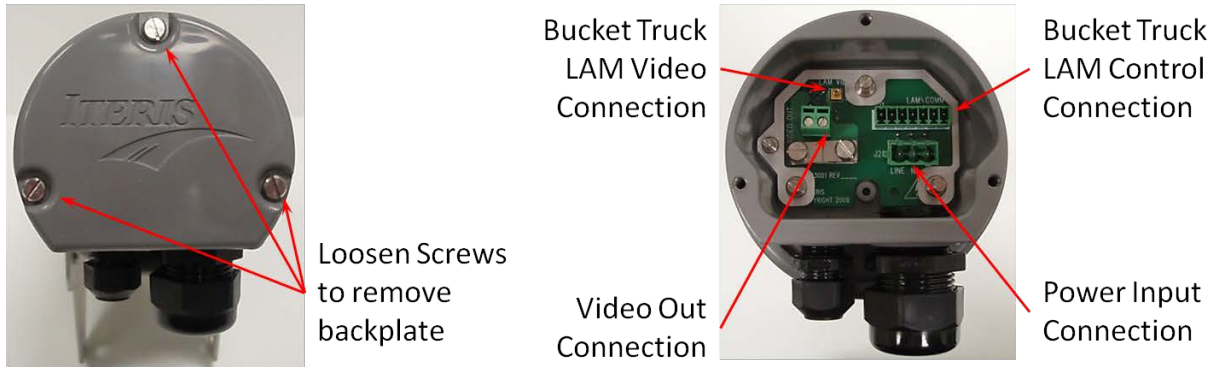
For a camera installation that does not have a metal structure to support the installation and grounding, a metal braid (as shown below) is recommended that would be equivalent to a #6 gauge wire. The metal braid should tie the body of the camera to a grounding rod that goes 6 feet under the floor or the nearest floor standing metal structure provided that metal structure has a relatively good ground to earth soil.



Identifying Recommended Grounding Braid

2.4 Camera Connections - RZ4 Advanced

Remove the cap from the back of the camera by loosening the three screws. The system is provided with a simple “Quick-Click” connection for the power and a terminal block for the video output.



Power Connection

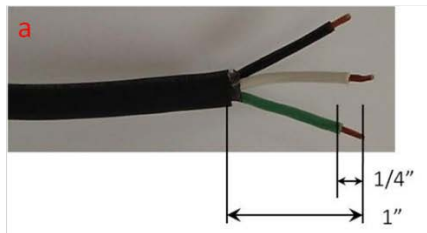
- Strip the outer sheath from the power cable back 1" (25mm) and the insulation from the three conductors back ¼" (6mm).
- Loosen the large cord grip and thread power cable through.
- Remove power connector from ship kit and install the conductors in the connector as per drawing. Ensure polarity of conductors is correct.

Important: A/C Power must be fused or connected to circuit breaker.



CAUTION! Failure to install the conductors correctly could result in camera damage and create an electrical shock hazard.

- Insert the plug into the connector on the back of the camera and tighten the large cord grip.



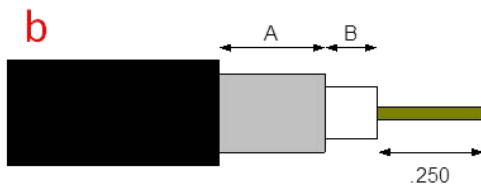
Cable	Connection
Black	L – Line
White	N – Neutral
Green	⏏ – Ground

Video Connector

- a. Loosen the coax cable clamp screws and remove clamp. Loosen the small cord grip.
- b. Strip Belden Coaxial Cable to length using Ideal Industries 45-521 coax stripping tool (Brown Cartridge). A = .328 B = .109in Strip .250in of inner conductor for insertion into the video connector.
- c. Feed cable through small cord grip and into video connector and tighten connector.

Note: The open connector space to the left of the video connection is not used and is only to provide mechanical rigidity to the terminal block.

- d. Replace coax cable clamp and tighten screws. Tighten small cord grip.



- e. Replace the cap on the back of the camera and tighten the three screws to complete the connection process.

2.5 Cabinet Connections

Power Connection (Power Surge Panel)

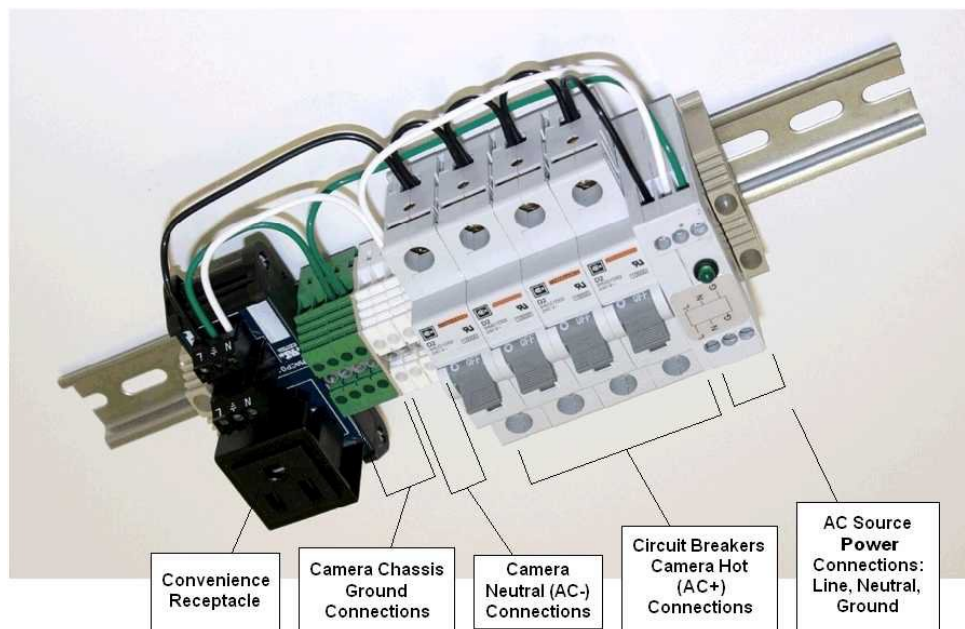
In the controller cabinet, AC power will need to be provided to each of the Vantage cameras. It is best to power the cameras from auxiliary breakers, to make sure that any damage to the camera power cables does not affect intersection cabinet power or controller operation.

The power panel should also include a surge protection device to minimize possible damage to the camera from various power surges and transients.

Important: A/C Power must be fused or connected to circuit breaker.

Note: All circuit breakers and or fuses should be sized appropriately for the load current.

Note: When calculating camera current requirements remember that the Vantage standard RZ-4 cameras are rated at 25 watts max.

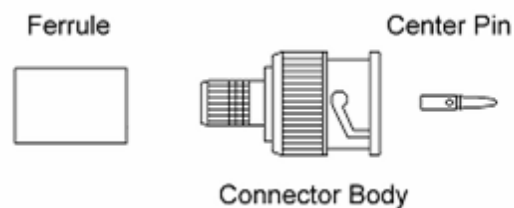


- Mount the Power Panel Assembly on the inside of the cabinet in close proximity to the camera power cables and the AC power source. Make sure all the circuit breakers are in the "Off" position.
- If you are using stranded wire, you should tin the wire ends with solder before clamping them down in the terminal block. Connect the individual camera power cable wires to the appropriate terminal block on the Power Panel Assembly. There are three wires in each camera power cable: (AC+) Hot, (AC-) Neutral, and Chassis Ground. The camera power cable chassis ground wire goes to the camera chassis ground block on the Power Panel Assembly, the camera power hot wire (AC+) goes to one of the circuit breakers on the Power Panel Assembly, and the camera power neutral wire should be terminated to the camera power neutral (AC-) terminal block on the Power Panel Assembly.

If you have more than four cameras, you can double up (insert two wires) in two of the circuit breakers and two of the other (AC-) Neutral and Chassis Ground terminal blocks. Each circuit breaker is rated at two amps and a typical Iteris camera draws about 1/2 amp so this should not create any problems.

- c. Make sure the AC power is turned off before connecting the source wires to the Line, Neutral, and Ground terminal block on the Power Panel Assembly. NEVER attempt to make any connections unless all power is turned off. Never work with live circuits. Serious personal injury or even death can result. Only properly trained and qualified technicians should be making these terminations. With the AC power off, connect the Source AC+ Line wire to the terminal block connection labeled (L) "Line". Next, connect the Source AC- Neutral to the terminal block connection labeled (N) "Neutral". Connect the Source Ground to the terminal block labeled (G) "Ground".
- d. Double check all terminations to be sure they are correct, then carefully energize the AC Source power. The green LED on the Power Panel Assembly should illuminate indicating the presence of AC power.
- e. Carefully turn "On" each one of the four camera power breakers. The breakers should not trip, and each of the cameras should now have AC power.

[Video Connector \(BNC connection to Edge Processor\)](#)



Piece Amphenol BNC Connector

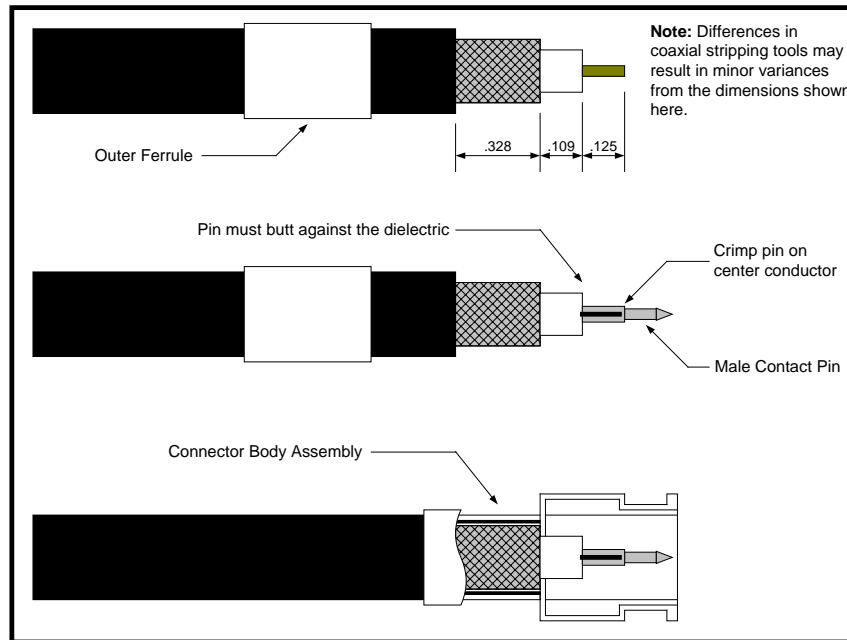
- a. Slide the outer ferrule of the Amphenol BNC connector over the coax cable.

Note: In the following steps, distances are measured from the end of the cable. Make all cuts sharp and square. Make sure the coaxial cable stripping tool is properly adjusted.

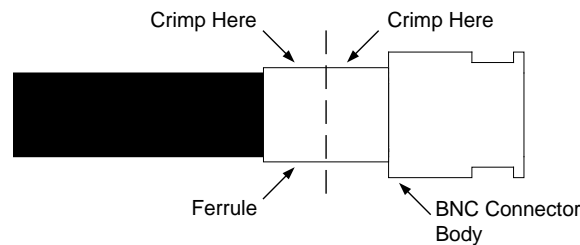
Note: Use an Ideal coaxial cable stripping tool or manually strip the coaxial cable to the required dimensions.

- b. When you cut the coaxial cable, it is best to use "cable cutters" to obtain a clean symmetrical cut. Diagonal pliers or straight jaw cutters will deform the coaxial cable and may cause problems crimping on the BNC connector ferrule. The rounded cutting jaws of cable cutter pliers prevent the coaxial cable from being deformed, and provide a round uniform base for the BNC connector ferrule to firmly attach to. Coaxial cable deformation also adversely affects the operation of the coaxial cable stripper, since the cable is grossly out of round.
- c. Strip .562" (14mm) from the outer sleeve of the coaxial cable.
- d. Strip .234" (6mm) from the coaxial shielding and flare the shielding slightly.
- e. Strip .125" (3mm) from the coaxial dielectric.

- f. Insert the male contact pin so that it butts up against the dielectric, crimp it in place using an Ideal Industries 30-483 coax crimping tool.
- g. Insert the connector body assembly over the dielectric and shielding and snap it into place. Make sure the center pin is completely seated in the connector body. Make sure none of the coaxial braided shield wires are allowed to make contact with the center conductor.
- h. Slide the outer ferrule over the braid and against the connector body. Crimp the outer ferrule in place using an Ideal Industries 30-483 coax crimping tool. Crimp the ferrule in two locations as shown in the diagram "Final Crimping of the BNC Ferrule" in the following section.
- i. Apply a five-pound pull test to verify that the connector is crimped securely.
- j. Connect the BNC to the back of the camera.



Belden Coaxial Cable with Amphenol BNC Connector



Final Crimping of the BNC Ferrule

Video Surge Protection

Surge protection must be correctly installed as a crucial part of every Vantage system installation. The surge protector not only protects your Vantage equipment from voltage spikes, but also bleeds off voltages induced on the video coaxial cable. These standing voltages, if they were not neutralized, have the potential to damage the Vantage processor.



The surge protector device that ships with the Vantage equipment is the EDCO CX06-M; which is a good general purpose, multi-strike, in-line surge protection device. The EDCO CX06-M is the surge protection device that has been approved for use with the Vantage video detection equipment. The EDCO surge suppressor is provided with each Vantage processor. The EDCO CX06-M is a readily available, off the shelf, surge protection device.

The specification sheet for the surge protection device is available in the "Technical Information" section of this manual. All surge protection must be approved by Iteris for use with the Vantage video detection systems. Failure to install surge protection, or using non-approved surge protection devices, will void the Vantage equipment warranties.

⚠ Important: *The surge protection device must be grounded to operate correctly. Failure to correctly ground the surge protection device may result in damage to the Edge2 modules. A 14 gauge or larger wire run the shortest distance to ground, without severe bends, and to a common chassis ground point, is usually best. See the surge protection device manufacturer's recommendations for more specific information.*

Also, make sure the surge protector is oriented correctly. The "cable" side should come from the Vantage camera, while the "equipment" side should go to the Vantage processor video input. Reversing these surge device connections can result in significantly reduced surge protection and a greater risk of damage to your Vantage equipment.

3. Camera Adjustment

3.1 Field Of View Setup

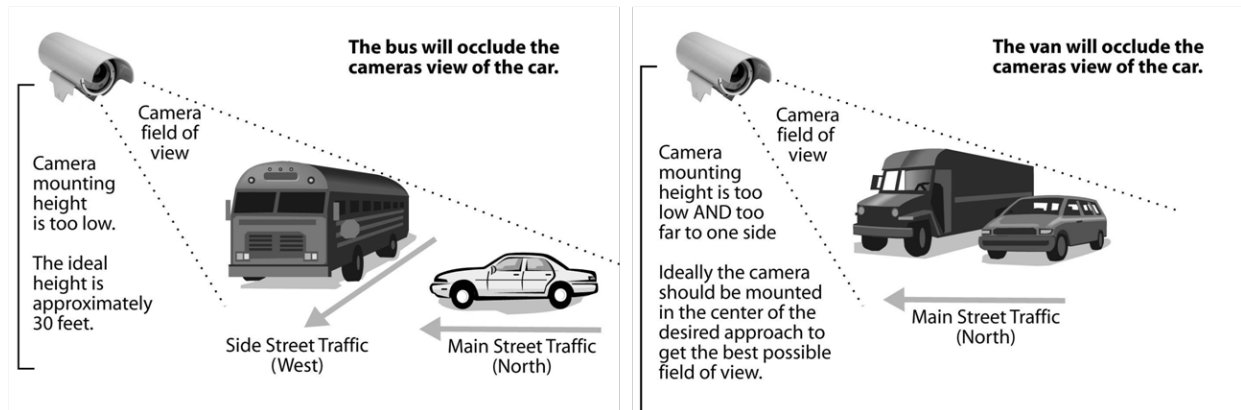
The image provided by the camera is critical to system performance. A good field of view (FOV) will ensure the best possible results from the system.

The following should be kept in mind when adjusting the camera:

- Occlusion
- No Horizon in FOV
- Minimum 4 lane width
- Stop bar area 20% to 60% from bottom of screen
- Car bumpers parallel to bottom of screen
- Adequate area left for advanced detection

Occlusion

A major issue with camera FOV is occlusion. If large vehicles block lanes or smaller vehicles then detection will not be possible.



Horizon

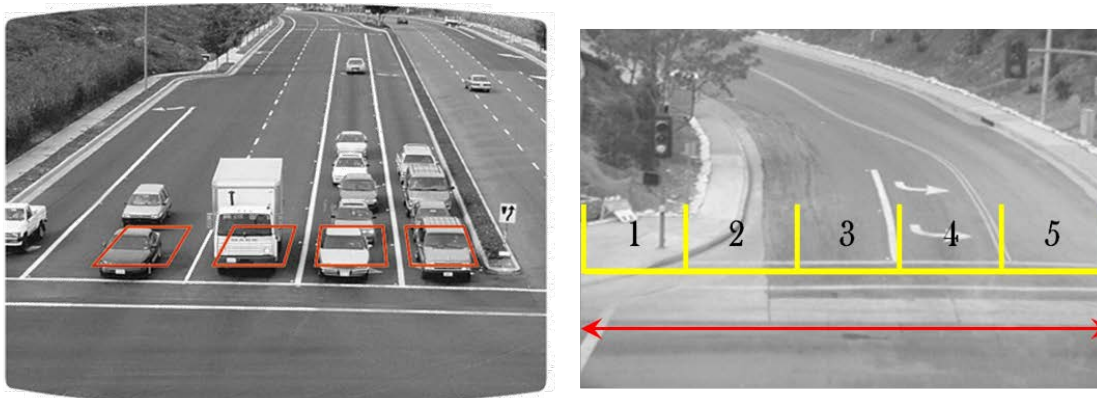
You never want the horizon to be included as part of your camera field of view. If the horizon is visible as part of your field of view on East and West approaches, the camera maybe blinded by the sun at sunrise and sunset. The camera should be rotated so that the bumpers of the vehicles are parallel with the bottom of the screen.



Examples of Poor FOVs

Four Lane Minimum Width

Ideally, the camera should be zoomed in until a minimum of 4 lanes are visible, the horizon should not be included as a part of the field of view. The zones should be drawn within the lane lines and should be the size of a medium vehicle.



Examples of Good FOVs

Physical Camera Adjustment

Centering the Camera – The camera should be mounted so that it is centered, as much as possible, in relation to the field of view (vehicle approach). Extreme side shooting can result in reduced performance and vehicle occlusion. See the section in this manual on "Occlusion" for more information.



Very Poor Mounting - Side Shoot, Camera Not Centered

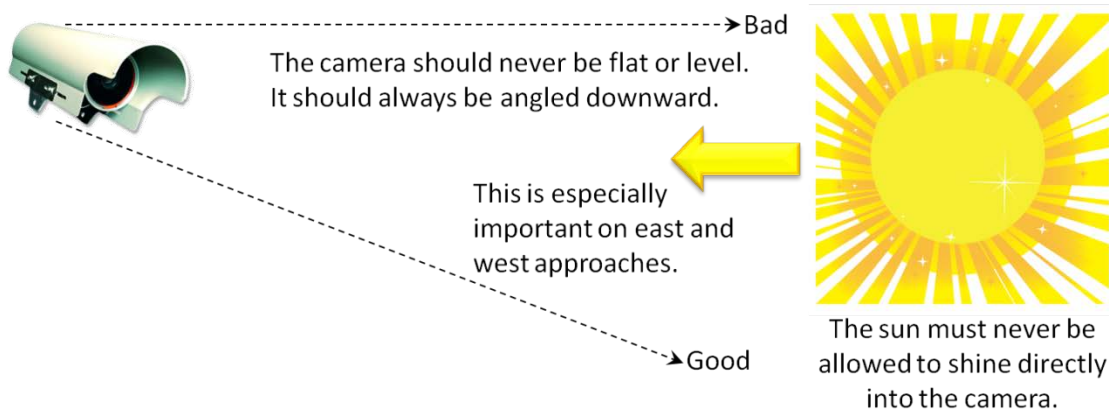
Proper Mounting Height – The camera should be mounted at approximately 30 feet for optimal system performance. For lower mountings, like a mast arm mount, a suitable camera extension bracket should be used to increase the camera mounting height to a more workable elevation. A camera mounting height of 25 feet or more can usually be obtained by using an extension bracket. Low mounting heights can result in reduced system performance and vehicle occlusion.

P Important: *How far can the camera typically see out at a mounting height of 30 feet?*

The basic formula for LEVEL ground is for every one foot of height you can see out 10 feet. So, on level ground, at a 30 foot mounting height, you should be able to get accurate detection as far as three hundred feet. This measurement is from the camera mounting location, not from the intersection stop bar area.

✓ Note: *The importance of camera centering versus camera height deserves some further discussion. It must be recognized how important centering the camera is to optimal system performance. In many cases centering the camera is more important than getting an additional five feet of height. For instance, when dealing with a short luminaire arm on a very wide roadway, it might be a better choice to mount the camera on the mast arm with a suitable extension bracket. With the right extension bracket you should be able to achieve a mounting height of about 25 feet. While this is less than the 30 feet you would achieve with a luminaire mounting, the ability to center the camera over the roadway in this example makes the mast arm with a six foot extension bracket the better choice. The luminaire mounting would get the camera up a little higher, but because the luminaire arm is short and the roadway is wide, this would place the camera way off to one side and would adversely impact the field of view. Remember there are two considerations for camera mounting (height and centering) and they both must be carefully evaluated.*

Maintain a Proper Camera Angle – The physical camera adjustments are done by adjusting the camera bracket mounting bolts to set the mechanical camera pan and tilt after the camera bracket has been mounted to the arm or pole. The camera should always be tilted slightly downward and should never be flat or beyond horizontal. When could a camera be in danger of being beyond horizontal? When the camera is aiming uphill on a steep grade. The distance the camera can look out is significantly reduced on approaches with a steep uphill grade.



Pull the visor forward – You should have the camera sun shield (visor) far enough forward to give the camera maximum protection from the sun. By loosening the two hose clamp set screws, the camera body can be moved backward in the clamps, effectively lengthening the sun shield visor. Move the camera body back all the way or until the edges of the sun shield visor are just barely visible in the top left and right corners of the field of view. See the following examples.



Too Much Camera Visor in the FOV



Maximum Acceptable Amount of Visor In the FOV

Rotate the Camera Body – Ideally, for most intersection applications, vehicles should flow from the top of the screen to the bottom of the screen. By loosening the two hose clamp set screws, the camera body can rotate to better square up the FOV image. The car bumpers should also end up being parallel with the bottom of the screen.



The Camera Body Should Be Rotated



Acceptable Camera Alignment

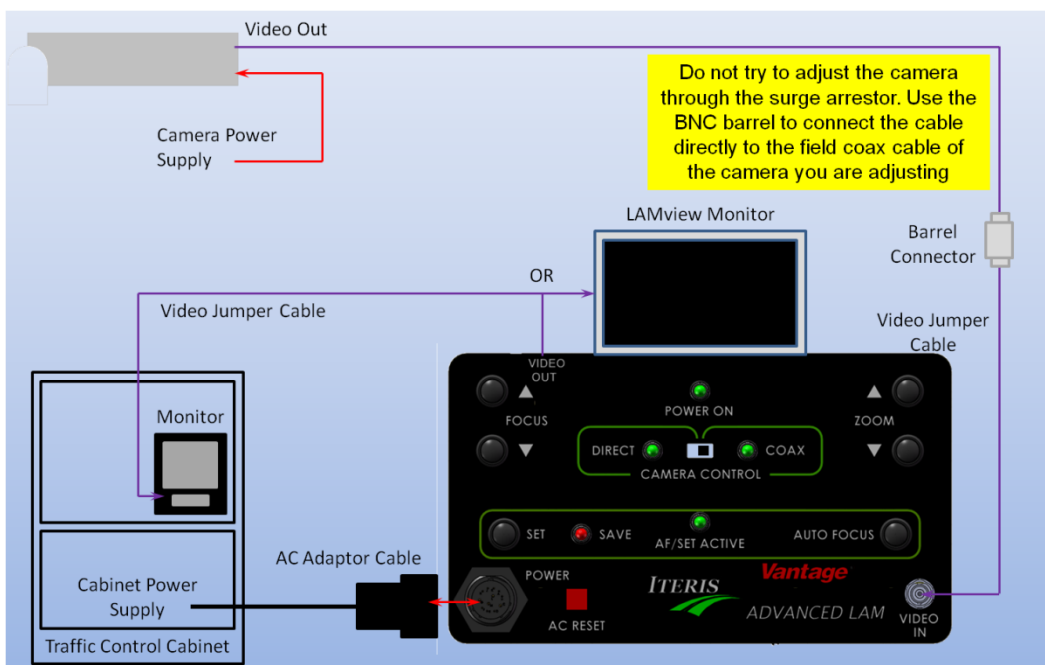
Proper Camera Focus Adjustment – When you are sure that you can obtain the desired FOV, you will need to focus the camera using the LAM. Proper focus is crucial for optimal Vantage system detection performance. A camera that is out of focus can significantly reduce the Vantage systems ability to perform; so it is important to take the time to adjust the focus properly.

3.2 Camera Adjustment

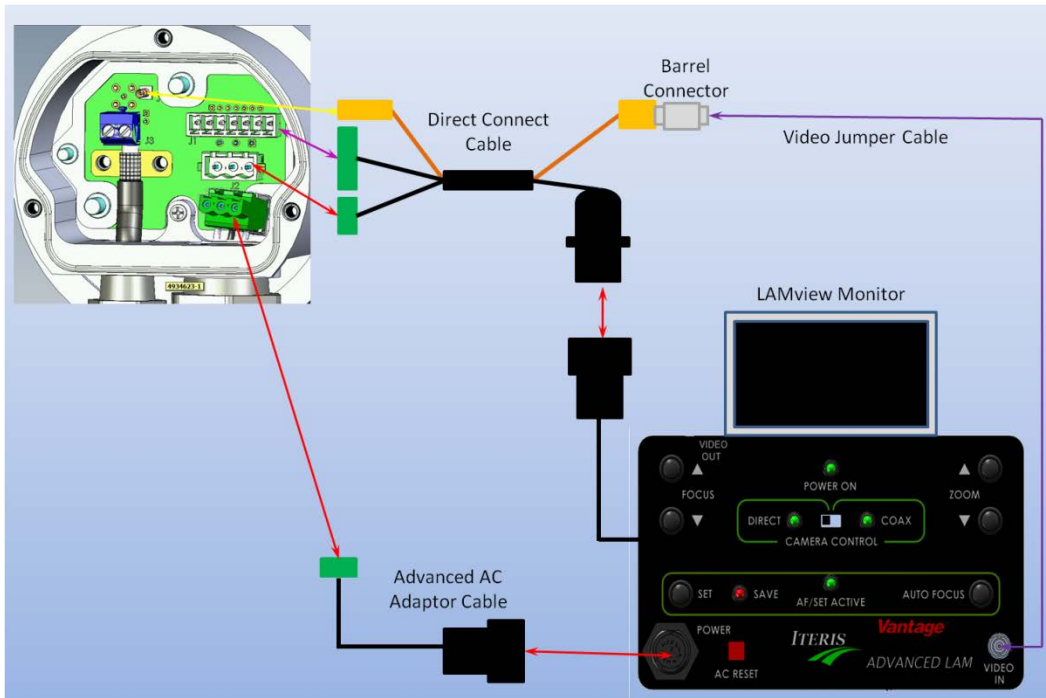
Lens Adjustment Module (LAM) Hook Up

Camera adjustment is achieved using the Lens Adjustment Module (LAM). There are various versions of this device the latest being the ADVANCED LAM. Please refer to the user manual provided with your LAM for correct Hook Up and Adjustment.

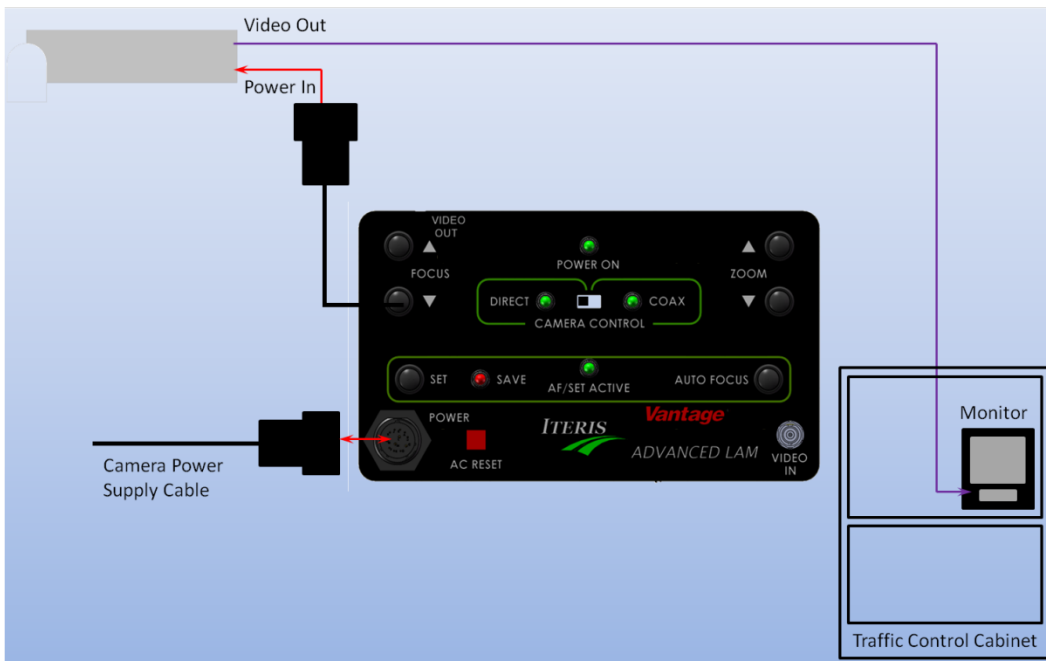
RZ4 Advanced Hook Up from the Ground



RZ4 Advanced Hook Up – Direct Connect



RZ4 C and M Hook Up



Lens Adjustment Module (LAM) Field of View Adjustments

There are two buttons on the LAM which allow you to control the zoom, wide angle (zoom out) or telephoto (Zoom in) and two buttons which allow you to control the focus adjustment. In addition there are two buttons marked 'Set' and 'Auto Focus'

- a. Turn "On" the monitor if your LAM is equipped with one. Camera video should now be visible. If the LAM is not equipped with a monitor, camera video should be visible on the cabinet monitor.
- b. Use the LAM "Zoom Buttons" to obtain the proper Field Of View (FOV). Remember: The FOV should be a minimum of four lanes wide and medium sized vehicles at the stop bar area should be about the size of your thumb when using a nine inch monitor. Horizon should never be included as part of the FOV.
- c. Once the proper FOV has been obtained, press the LAM "Auto Focus Button". It is best to wait till traffic is stopped before attempting to Auto Focus. A pink rectangular shape will appear in the lower right corner of the monitor image indicating that the camera is trying to focus. Never press any other buttons while the rectangular focus indicator is still visible.
- d. When proper focus has been obtained you must save the camera settings. To do this, press the LAM "Set Button". The "Save Light" on the LAM module should illuminate indicating the settings are being saved. Do not press any buttons while the Save Light is still on. If the camera settings are not properly saved, the camera will return to its factory default settings whenever camera power is cycled.
- e. This completes the camera setup process. Disconnect the LAM module and reconnect the camera video cable to the Edge processor and remove power from the LAM module.
- f. You should now see the video image displayed on the monitor in the traffic control cabinet. If you have a LAMVIEW with a built in video monitor the image should be displayed on the LAMVIEW monitor also.

Note: *If a video image is not displayed, refer to [Section 4: Troubleshooting](#).*

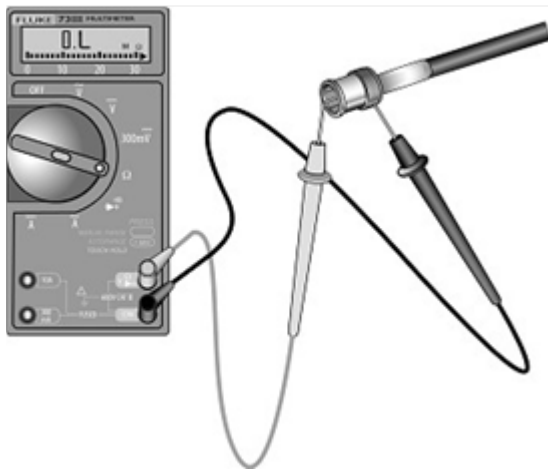
Note: *Some monitors do not show the user the true field of view, therefore, it is actually possible to have horizon in the FOV and not realize it. If the monitor has a vertical hold adjustment control, roll the picture up and down to see everything that is actually contained in the frame. When purchasing a monitor for use with the Vantage systems it is recommended that you buy a monitor with a vertical hold adjustment or an underscan switch.*

- g. Process Completed - Disconnect the LAM and reconnect the camera power and video cable. You are ready to move on to setting up the Vantage processor.

4. Troubleshooting Guide

Symptom A: No Video in Cabinet

- i. Verify that the coaxial cable is not touching the cabinet or signal pole.
- ii. Check for short circuit on the coax cable assembly using a multimeter. Set your multimeter to the 'ohms' (resistance) measurement setting. At the processor end of the cable run put one probe on the center pin and the other probe on the outer BNC connector body. A resistance measurement of less than 15Ω indicates a possible short circuit. A resistance measurement of more than $500k\Omega$ indicates a possible open circuit. If the resistance measurement is outside the range indicated check the BNC and camera connections and the integrity of the coax cable. Be aware that some open connections can be intermittent making them more difficult to diagnose.



This picture shows the technique for checking the BNC connector using a multimeter. One meter lead probe is on the BNC center pin, the other meter lead probe is touching the BNC body. The multimeter should be set to ohms or continuity.

Symptom B: I cannot zoom and focus my camera with the LAM:

- i. Are the camera power cables and video cables connected correctly? Recheck the cable connections by referring to the previous diagrams and table found in this section.
- ii. Is the cabinet monitor connected, adjusted correctly, and plugged in to a valid working power source?
- iii. Is power correctly connected to the camera? See the "Power Connector" section of this manual for more information.
- iv. Is the camera power cable correctly terminated at the cabinet? See the "Cabinet Camera Power Connections" section of this manual for more information. Is the power "On"? Check the circuit breaker or fuse.
- v. If the LAM has a built-in monitor, is the switch "ON"?
- vi. The RZ4 color cameras require the new LAMs for field of view adjustments. The new LAM is backwardly compatible with the RZ3 black and white cameras.
- vii. For proper operation of the new LAM, make sure to connect the LAM to the camera first and then connect power to the LAM last.
- viii. In extremely cold weather, apply power to the camera and let it warm up for a while before using the LAM to adjust the field of view.
- ix. Connect the LAM to a different camera and see if you can zoom and focus.

- x. If these steps fail to remedy the situation, the LAM maybe bad and needs to be sent in for repair.

Symptom C: Intermittent Video

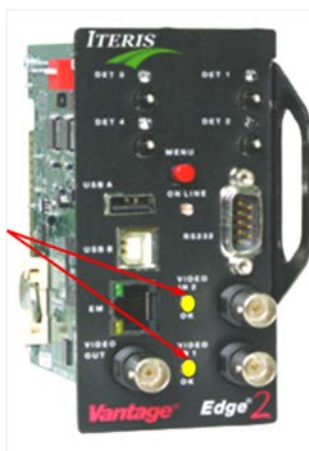
Video flickering on and off on the monitor along with the yellow LEDs on the processor.

Note: The yellow LEDs on the processor should be on solid.

- i. Check all of the BNC connections, move the coax cable at the camera, surge arrestors, all video connection if the video responds to the movement of the cable replace the BNC using the correct BNC and procedure.
- ii. If BNC's are good check the power connector at the camera. Unplug the connector at the camera look at the end you should be able to see all the pins if they are fully inserted.

Note: All the pins should be installed to create a water tight connector.

Yellow LEDs on indicate a valid signal from the camera is being received



Symptom D: Noise on the monitor.

- i. Most common cause is a faulty BNC connector at the camera.
- ii. A loose common or faulty ground in the traffic signal system can induce AC voltage onto the coax cable.
- iii. A splice in the coax cable located in a pole. If not properly insulated, it can pick up stray voltage or possible create a difference in ground potential when the BNC comes in contact with a grounded object. (Ground loop)
- iv. Measure to see if there is AC on the center conductor and/or shield of the coax cable. If there is voltage on the coax, it can cause erratic behavior in detection and shorten the life of your components as well as and cause noise on the monitor.
- v. Make sure the video surge arrestors are grounded to the ground rod or grounding bus bar using a 14 gage wire or larger. The length should be 4 feet in length or less.

Symptom E: The video on the monitor looks too bright.

- i. Adjust the brightness and contrast controls on the monitor.
- ii. Check the video termination jumpers or dip switches on the processor. If the processor video inputs are set to HiZ then the picture will look bright.
- iii. If these steps fail to remedy the situation, the camera maybe bad and needs to be sent in for repair.

Symptom F: The video on the monitor looks dark.

- i. Adjust the brightness and contrast controls on the monitor.
- ii. Check the BNC connectors at both ends of the coax cable. A poor connection can result in high resistance and a dark picture.
- iii. Check the video termination jumpers or dip switches on the processor. If the video from the camera has a "T" sending video to multiple devices, one of the cards will have to be set to HiZ or the video signal will be degraded.
- iv. If these steps fail to remedy the situation, the camera maybe bad and needs to be sent in for repair.

Symptom G: When I connect 1 video I get multiple Video In OK LEDs coming on.

- i. Check the video termination jumpers or dip switches. If the processor video inputs are set to HiZ then video may bleed over to adjacent channels.

5. MAINTENANCE

The Vantage Video Detection System, once correctly installed, requires a minimal amount of maintenance.

Camera Cleaning

Because Vantage video detection is a machine vision based system, one of the big operational concerns is keeping the front camera glass reasonably clean. A regular maintenance program should be implemented to ensure the front camera glass is kept free from dirt and debris. The camera housing glass should be cleaned at least once a year, or more frequently if required, especially under severe environmental conditions. Dirty camera glass is one of the leading contributors to decreased Vantage system performance. The use of a soft cotton cloth (non-abrasive) and water is the recommended method for camera glass cleaning. Avoid leaving streaks on the glass. Avoid anything that might scratch the glass, cloud the glass, or leave an undesirable residue.

Connector and Cable Inspection

Periodically, it is wise to check camera power and video connections. Look for connector corrosion or moisture damage. Replace any defective connectors. Cabinet power and video cable and connections can also be checked for excessive wear or other defects. Repair or replace the defective cable or connectors as needed.

6. Technical Information

Belden Coaxial Cable

Iteris requires the use of Belden 8281 coax cable for all installations.

Description	Part No.	UL NEC/ C(UL) CEC Type	Standard Lengths		Standard Unit Weight		Conductor (stranding) Diameter Nom. DCR	Nominal Core OD		Shielding Materials Nom. DCR	Nominal OD		Nom. Imp. (Ω)	Nom. Vol. of Prop.	Nominal Capacitance		Nominal Attenuation		
			Ft.	m	Lbs.	kg		Inch	mm		Inch	mm			pF/Ft.	pF/m	MHz	dB/100 Ft.	dB/100m
RG-59/U Type • 20 AWG Solid .031 Bare Copper Conductor • Tinned Copper/Bare Copper Double Braid Shield (98% Coverage)																			
Polyethylene Insulation • Polyethylene Jacket (Available in Red, Yellow, Green, Light Blue, White, Orange or Black)																			
80°C	8281	—	500 [▲]	152.4	37.5	17.0	20 AWG (solid)	.198	5.03	TC Double Braid	.305	7.75	75	66%	21.0	68.9	1	.3	1.0
			1000	304.8	74.0	33.6	.031 BC			98% Shield Coverage							3.6	.5	1.6
							9.9W/M			1.1W/M							10.0	.8	2.6
							32.5W/km			3.6W/km							71.5	2.1	6.9
																	135	3.0	9.8
																	270	4.3	14.1
																	360	5.1	16.7
																	540	6.3	20.7
																	720	7.4	24.3
																	750	7.6	24.9
																	1000	9.2	30.2

▲500 ft. put-up not available in White.
Max operating voltage — Non UL 2900V RMS

EDCO Surge Protection

The Edco CX06-M, Surge Protective Device (SPD) implements three-stage hybrid technology. The SPD addresses over-voltage transients with a primary Gas Discharge Tube (GDT), and secondary Silicon Avalanche Diode (SAD) component. Over-current protection, e.g. sneak and fault currents, are mitigated with solid-state resettable fuses — PTCs.



The Edco CX06-M SPDs are designed in accordance with NFPA 780 (2004 edition) requirements, with up to 20 kA of surge current capability.

General Technical Specification	
Operating Voltage:	5 VDC
Clamping Voltage:	6 VDC
Operating Current:	0.15 A
Peak Surge Current:	20 kA (8 x 20 μs)
Frequency Range:	0 to 20 MHz
Insertion Loss:	< 0.1 dB at 20 MHz
Response Time:	>.5ns
SPD Technology:	GDT, SAD, w/Series PTC
Connection Type:	BNC, 50/75 Ohm
Operating Temperature:	-40°C to +85°C -40°F to +185°F
Dimensions (H x W L):	1.5" x 1" x 3.25" 38mm x 25mm x 83mm
Weight:	2.3 oz .065 kg
Certifications:	UL 497B Listed

Power Cable

Iteris requires the use of outdoor rated 16AWG 3 conductor cable for powering the Vector sensor. The cable should be UV, water and chemical resistant.

Sample cables

Carolprene[®] Jacketed Type SJOOW 90°C 300 Volt UL/CSA Portable Cord



Product Construction:

Conductors:

- 18 through 10 AWG fully annealed stranded bare copper per ASTM B-174

Insulation:

- Premium-grade, color-coded 90°C EPDM
- Color code: See chart below

Jacket:

- Carolprene[®], black
- Temperature range: -40°C to +90°C

Jacket Marking:

- CAROL (SIZE) (mm²) 90°C (UL) WATER RESISTANT SJOOW CSA (-40°C) FT-2 P-7K-123033 MSHA 300 VOLT RoHS MADE IN USA

Applications:

- Portable tools and equipment
- Portable appliances
- Small motors and associated machinery

Features:

- Excellent resistance to oil and moisture
- Good tensile strength, elongation and aging characteristics
- High flexibility
- Excellent abrasion resistance
- Water-resistant
- UL Listed and CSA Certified for indoor and outdoor use
- Ozone-sunlight (UV)- and weather-resistant

Industry Approvals:

- UL Flexible Cord - UL Subject 62
- CSA Flexible Cord - C22.2-49
- MSHA Approved
- RoHS Compliant

Packaging:

- 250' (76.2 m), 500' (152.4 m), 1000' (304.8 m)
- Other put-ups available on special order



TYPE SJOOW – 300 VOLT – UL/CSA

CATALOG NUMBER	NO. OF COND.	AWG SIZE	COND. STRAND	NOMINAL INS. THICKNESS		NOMINAL O.D.		CURRENT AMPS [†]	APPROX. NET WT. LBS/M ^(§)	STD. CTN.
				INCHES	mm	INCHES	mm			
01310	2	18	16/30	0.030	0.76	0.285	7.24	10	51	1000'
01311	3	18	16/30	0.030	0.76	0.305	7.75	10	63	1000'
01344	4	18	16/30	0.030	0.76	0.330	8.38	7	76	250'
01312	2	16	26/30	0.030	0.76	0.310	7.87	13	60	1000'
01342	3	16	26/30	0.030	0.76	0.330	8.38	13	76	250'
01343	4	16	26/30	0.030	0.76	0.365	9.27	10	95	250'
01358	2	14	41/30	0.030	0.76	0.340	8.64	18	79	250'
01360	3	14	41/30	0.030	0.76	0.370	9.40	18	106	250'
01364	4	14	41/30	0.030	0.76	0.410	10.41	15	121	250'
01379	2	12	65/30	0.030	0.76	0.410	10.41	25	117	250'
01380	3	12	65/30	0.030	0.76	0.430	10.92	25	146	250'
01381	4	12	65/30	0.030	0.76	0.475	12.07	20	185	250'
01382*	2	10	104/30	0.045	1.14	0.560	14.22	30	210	250'
01383	3	10	104/30	0.045	1.14	0.580	14.73	30	242	250'
01384	4	10	104/30	0.045	1.14	0.655	16.64	25	304	250'

Cord furnished with UL and CSA labels.

* Non-stock item; minimum quantity purchase required.

† Green conductor for grounding only. Ampacities based on NEC table 400.5(A).

§ Actual shipping weight may vary.



PRODUCT DATA SHEET

Controlled Document - Engineering Drive

1530 Shields Drive
 Waukegan, IL 60085
 Toll-Free (800) 323-9355
 Fax: (847) 689-1192

Seoprene® 300V SJEOOW

Construction Parameters:

CONDUCTOR: 18 AWG - 10 AWG Class K stranded bare copper per ASTM B-174
INSULATION: TPE
JACKET: TPE
COLOR: Black (Other colors available upon request)
COLOR: *White

PRINT LEGEND: CCI SEOPRENE 105C XX AWG (X.XX mm²) X/C SJEOOW E54864 (UL) 300V -50C TO 105C -- CSA LL39753 SJTOOW (TPE) 300V -50C TO 105C FT2 WATER RESISTANT

INDENT LEGEND: P-241-3-MSHA

***PRINT LEGEND:** CCI SEOPRENE 105C XX AWG (X.XX mm²) X/C SJEOOW E54864 (UL) 300V -50C TO 105C -- CSA LL39753 SJTOOW (TPE) 300V -50C TO 105C FT2 WATER RESISTANT P-241-3-MSHA

PHYSICAL PROPERTIES:

TEMPERATURE RANGE -50°C to 105°C
WATER RESISTANT: Yes

ELECTRICAL PROPERTIES:

VOLTAGE RATING: 300V rms, Max

Industry Approvals:

- o UL Standard 62
- o CSA Standard C22.2 No. 49
- o NEC Article 501.140 Class I Div. 2
- o NEC Article 400
- o Federal Spec JC580
- o Passes CSA FT2 Flame Test
- o MSHA
- o EPA 40 CFR, Part 26, Subpart C, heavy metals per Table 1, TCLP method

Part Number	AWG	No. Cond.	Stranding	Insulation Wall, Nom.		O.D., Nom.		Net Weight		Amps*	Nom. DCR Ω/1M'
				Inches	mm	Inches	mm	Lb./kft.	kg/km		
23225	18	2	16/30	0.030	0.76	0.285	7.24	37	55	10	6.59
23325	18	3	16/30	0.030	0.76	0.308	7.82	49	73	10	6.59
23425	18	4	16/30	0.030	0.76	0.328	8.33	59	88	7	6.59
23226	16	2	16/30	0.030	0.76	0.310	7.87	46	68	13	4.05
23326	16	3	26/30	0.030	0.76	0.328	8.33	59	88	13	4.05
23426	16	4	26/30	0.030	0.76	0.353	8.97	73	109	10	4.05
23227	14	2	41/30	0.030	0.76	0.340	8.64	60	89	18	2.55
23327	14	3	41/30	0.030	0.76	0.363	9.22	79	118	18	2.55
23427	14	4	41/30	0.030	0.76	0.393	9.98	98	146	15	2.55
23228	12	2	65/30	0.030	0.76	0.410	10.41	90	134	25	1.61
23328	12	3	65/30	0.030	0.76	0.428	10.87	116	173	25	1.61
23428	12	4	65/30	0.030	0.76	0.468	11.89	150	223	20	1.61
23229	10	2	104/30	0.045	1.14	0.545	13.84	155	231	30	0.98
23329	10	3	104/30	0.045	1.14	0.573	14.55	200	298	30	0.98
23429	10	4	104/30	0.045	1.14	0.628	15.95	257	382	25	0.98

Note: All dimensions & weights are nominal subject to industry standards and tolerances unless otherwise noted.

* Ampacity based on NEC Table 400.5(A) and CEC Table 12.

VIDEO DETECTION CABLE

Composite Camera Cable



Cable Identification

Ink jet print on jacket
 “ADVANCED DIGITAL CABLE,
 INC. 20 AWG PE Coax + 22
 AWG 2 PR IND SHLD PP + 18
 AWG 3 CDR PVC - PVC SUN
 RES/DIR BUR”

Specifications Coax	Specifications Multi-Conductors	Put-Ups
Conductor - 20 AWG Sol BC .032 Braid - 2x95% BC Jacket - LDPE .304 Nominal	Component 1 - 18 AWG/3c BC Insulation - PVC .082 Nominal Color Code - Blue, Brown, Green w/Yellow Stripe Component 2 - 22 AWG/2 ISP TC Insulation - Polypropylene .046 Nominal Shielding - Aluminum Mylar with drain Color Code - Black/Red, Green/White	Standard Reels 1,000', 2,500', 5,000' <i>Other lengths available. Please consult your factory representative for availability.</i>

PART NO.	COMPONENTS	OUTER JKT THICKNESS		NOMINAL O.D.		WEIGHT lbs. / 1M'
		INCH	mm	INCH	mm	
9928	3	.020 PVC	.508 PVC	.340 x .680	8.6 x 17.27	113

Vantage RZ-4 Advanced Camera Specifications

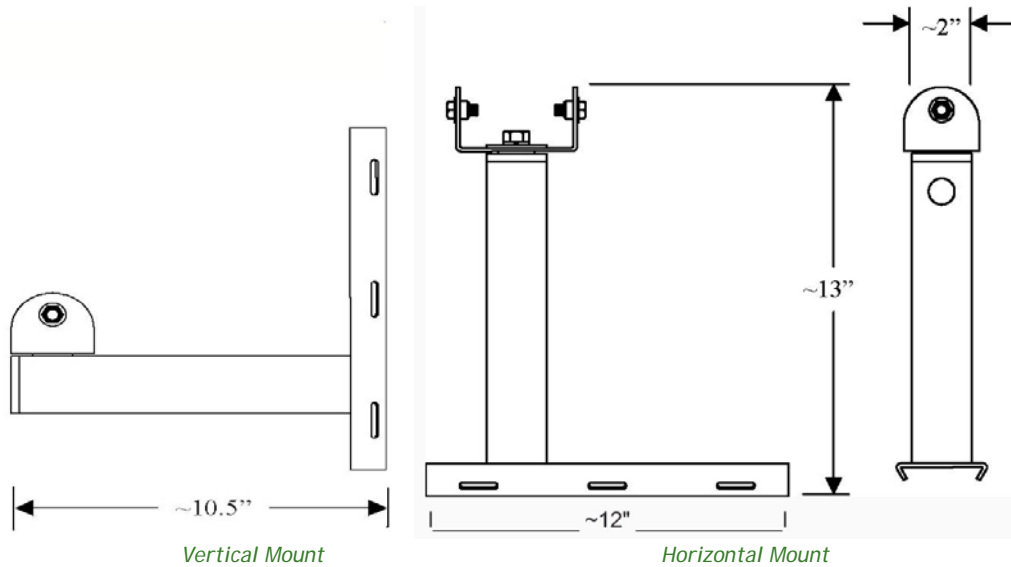
General Technical Specification	
Signal Format	NTSC/PAL
Video Output	Composite 1V p-p@75ohm
Imager	768 x 494 effective pixels 470 TV lines Automatic White Balance >50dB S/N Ratio .1 lux capable
Lens	Focal Length and Focus Adjustable Horizontal FOV from 5.4° Wide to 50.7° Wide
Universal Power Source	85-265V, 50/60Hz
Power Consumption	25W Max
Operating Temperature:	-35°C to +60°C (-31°F to +140°F)
Operating Humidity	0% to 100% relative humidity, non-condensing
Vibration	0.5G, 3 axes, 5-30 Hz
Dimensions (H x W L):	Length 17", Diameter 5" (Without Mounting Bracket) 432mm x 127mm
Weight:	5.7 lbs (2.6 kg)
Connection Type:	BNC, 50/75 Ohm Multi-pole connection for power

[Iteris Vantage Camera Bracket - Iteris Part: CAMBRKT4](#)

The Universal Camera Bracket is designed to accommodate both horizontal and vertical structure mounting. The mounting bracket mates perfectly with Iteris's wired and wireless cameras and is constructed using high strength 6061 aluminum. For added protection, the assembly is gray powder coated.

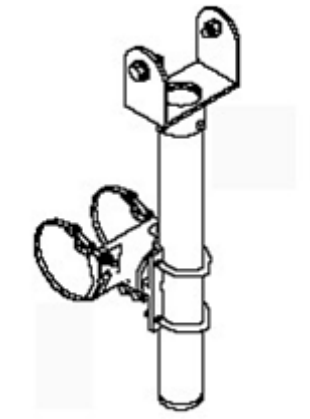
FEATURES & BENEFITS

- Universal Camera Mounting
- Horizontal for luminaire arm mounting
- Vertical for standard pole mounting
- High strength, light weight aluminum construction
- Easy pan/tilt angle adjustment
- Three banding slots for stainless steel banding of up to ¾ inch



PELCO "Astro Brac" 74 inch Camera Extension Bracket (Mast Arm Mounting)

PELCO has several models depending on band or cable mounting and with or without service outlet. Contact your local PELCO dealer for more information on these brackets.




AB-0175-5-96-ALO

7. PRODUCT SUPPORT

[Product Support Team](#)

The Iteris[®] Product Support Team consists of a group of highly skilled individuals that are knowledgeable and readily available to answer your questions or assist you with any of our Vantage products. Please do not hesitate to contact us at:

 Toll free: (888) 254-5487

For more information on Iteris, as well as the products and services that we provide, visit our website at:

 www.iteris.com

[Iteris Resource Center](#)

This site contains additional training and technical support information covering the whole range of Vantage products. Registration is easy. Visit the address below to register and begin enjoying the benefits immediately.

 www.iteris.com/support

The Resource Center app is available from the Apple App Store or the Google Play store.



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