

Vantage® ***Vector***® **User Guide**



ITERIS® *Innovation
for better mobility*



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FCC Statement

This equipment has been tested and found to comply with the limits for a class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference with radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their own expense.

The user is cautioned that changes and modifications made to the equipment without the approval of manufacturer could void the user's authority to operate this equipment.

FCC RF Exposure Statement

⚠ Caution: To comply with FCC RF exposure compliance requirements, a separation distance of at least 20 cm must be maintained between the antenna of this device and all persons.



FCC ID Location on Electronics Box



FCC ID Location on Electronics Board



FCC ID Location on Back of Radar



1. INTRODUCTION

Congratulations on your purchase of the Vantage Vector™ system. This vehicle detection sensor unit combines the power of video and radar sensor fusion for special applications. It marks the beginning of a new generation of intersection vehicle detection.

Proven Power of Video... and More

The Vantage Vector™ is an all-in-one vehicle detection sensor with a wide range of capabilities (i.e., stop bar detection, advanced-zone detection, moving object sensors) that enable advanced safety and adaptive control applications.

It includes all the proven benefits of Iteris video detection such as high accuracy, high availability, video image for remote viewing, no need to perform costly trenching or pavement cutting for installation, and added bicycle detection capability.

Enhanced Dilemma-Zone Precision

The Vantage Vector™ offers high precision for dilemma zone detection by integrating the video field-of-view with radar sensing. Enhanced information includes the number of vehicles, speed, and distance in user configurable zones that can be used for special applications.

Extended Range for Higher Speed Approaches

The extended range of the advanced zone includes enhanced count, speed, and occupancy (CSO) measurements, where data from advanced detection zones is desired.

Richer Data Enabling New Applications

The Vantage Vector™ enables an exciting new range of speed related intersection safety functions with the availability of vehicle location and speed data.

Additional Benefits

The Vantage Vector™ system adds the following benefits for your vehicle detection needs:

- New graphical-user-interface (GUI) maintains familiar video zone setup procedure ensuring that no new training is required
- Intuitive GUI with symbolic road graphics makes radar sensor setup simple and easy
- Wi-Fi connectivity between sensor head and roadside cabinet using a laptop or iPad®
- Industry standard detection outputs
- Non-intrusive sensor system for lower installation costs, lower life-cycle costs and safer installation versus in-pavement sensing since no trenching or pavement cutting is required
- Advanced design, color, and mounting blends the sensor into its surroundings for eye pleasing aesthetics
- Video detection up to 400 ft. and Radar detection up to 600 ft.
- Count, speed, and occupancy data
- Power of video and radar sensor fusion extends the detection range for special applications
- Exceptional vehicle tracking for directional discrimination

Setup Tool

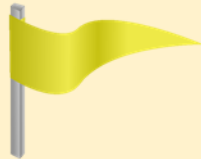
- PC or iPad version
- Wi-Fi connectivity to sensor head from roadside cabinet
- Two levels of security
 - WEP secured wireless network
 - User defined login password
- Unlock soft-key prevents accidental inputs
- Approach indicator/label
- Software upgrades

Video GUI Setup

- Camera zoom and focus feature
- Camera adjustments are made easy with the looping snapshots
- Store snapshots for later reference

Radar GUI Setup

- Radar angle adjustment
- Intersection offset adjustment
- User configurable trigger points
- Trigger point indicators - color change when vehicle is detected





Important

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

2. GETTING STARTED

This User Guide will walk you through the installation, setup and startup of the Vantage Vector™ vehicle detection sensor unit. Follow the sections in the order as laid out within this guide. If you have questions once you have completed the steps within this guide, refer to [Section 8: TROUBLESHOOTING – FAQ](#) or contact product support using the number listed in [Section 10: PRODUCT SUPPORT](#).


Use the table below to ensure you have the tools and components necessary to complete the installation process.

Prepare	Description
Power and Coax	Ensure that 110V or 220V AC power is available.
Mounting Position	The unit is intended to mount on the Luminaire or Mast Arm.
Required Tools	<p>Various wrenches (a 7/16" nut driver or socket is recommended), coax stripping tool, banding tool, screwdrivers, etc.</p>  <p><i>Required Tools</i></p>
Package Contents	<p>Vantage Vector™ Sensor, Processor and Ship Kit.</p>  <p><i>Package Contents</i></p>
Other Required	We recommend a Power Surge Panel for reliable operation.

3. INSTALLATION

This section covers the mounting of the Vantage Vector™ traffic camera unit and the installation of the processor.

3.1 Sensor Mounting

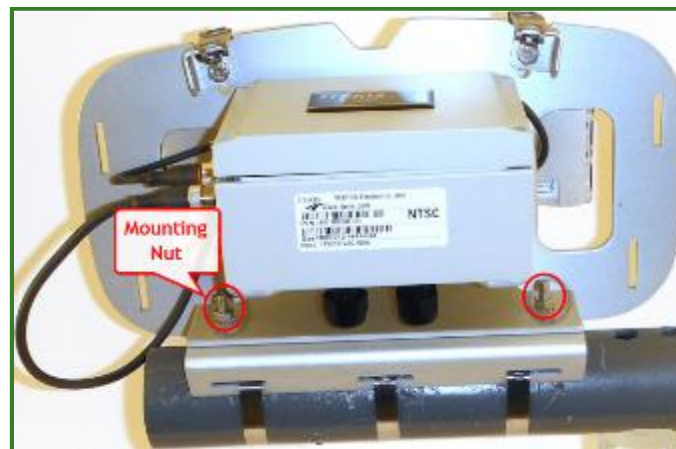
 **Caution:** Ensure AC power is turned **OFF** before proceeding.

1. Mount the Vantage Vector™ unit as described in the steps below.
 - a. Separate the unit from the mounting bracket.
 - b. Mount the bracket horizontally to the mast or luminaire arm using stainless steel banding.



Banding Mounting Bracket to Arm

- c. Install the unit to the bracket and tighten the mounting nuts.



Banding Mounting Bracket to Arm

2. Identify the approach for each unit and record each unit's serial number with their respective approach.

Connect the coax and AC cables as described in the steps below.

Important: Please refer to [Section 9: 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.

Note: Cable connections for the Vantage Vector™ are similar to those of the Vantage RZ4A camera.

- a. Slide the coax and power cables through the black cord grips on the electronics box.

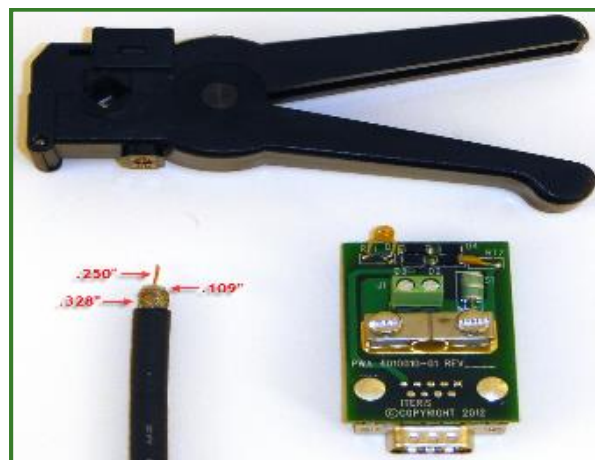


Tightening Cord Grips

- b. Using the coax stripping tool, strip the coax cable then connect it to the small board inside electronics box.

Important: When stripping and connecting the coax cable, be sure to strip to the specifications as shown. Ensure the copper wire is inserted into the green connector while the metal ground fibers are resting on the copper base of the board.

- c. Tighten down the coax board clamp.



Connecting Coax Cable

⊠ Caution: Before proceeding ensure the power is **OFF** at the circuit breaker.

℞ 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.

d. Strip and connect the AC wiring to the small connector inside the electronics box.

⊠ Caution: When stripping and connecting the AC cable, be sure to insert the Black (L), White (N) and Green (GND) wires into the correct connections. If not connected properly, unit malfunction or personal injury may result.



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

Connecting AC Cable

e. Plug the coax connection into the main VDE board in the electronics box.

f. Plug the AC connection into the power board in the electronics box.



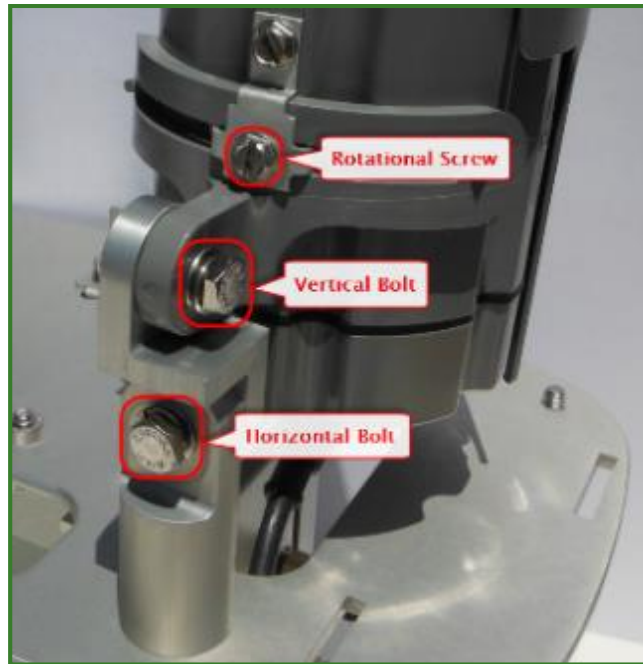
Plugging in Coax & AC

g. Tighten the cord grips under the electronics box to fasten coax and AC cables in place.

☑ **Note:** Restore the AC power after connecting the coax and AC cables.

3. With your 7/16" nut driver or socket and your screw driver, adjust the camera toward the stop bar using the rotational screw, vertical bolt and horizontal bolt as shown.

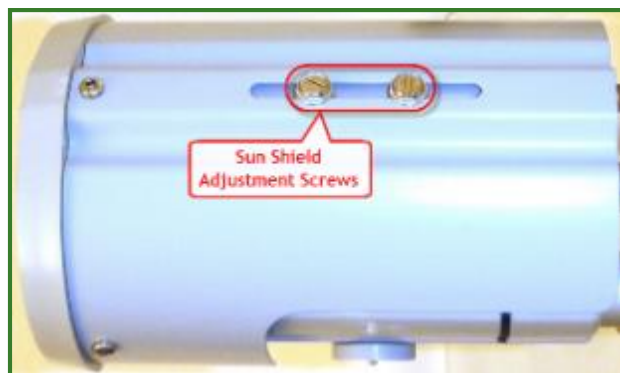
☑ **Note:** Use the setup tool to ensure that the camera is correctly positioned toward the stop bar; refer to [Sections 4 or 5 : PC or iPad SETUP TOOL](#).



Adjusting Camera

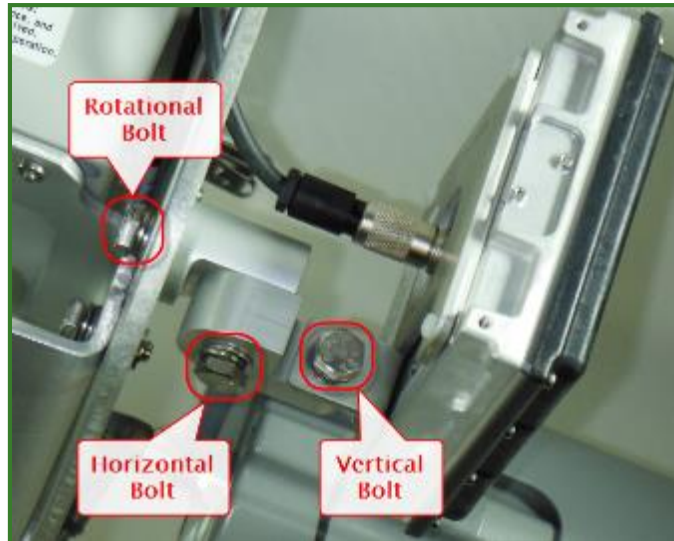
4. Adjust the sun shield on the top of the camera by loosening the screw then sliding it into a position that shields the camera lens.

Important: Do not slide the sunshield too far out or the camera visibility may be impaired.



Adjusting Camera's Sun Shield

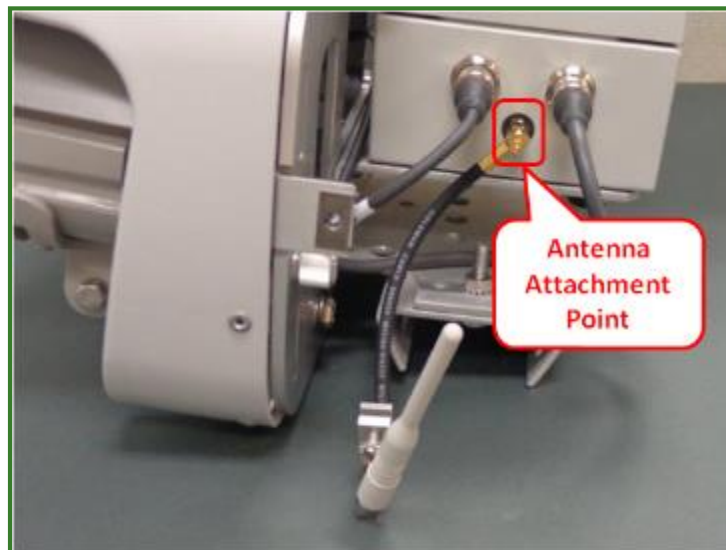
5. Tilt and pan the radar head using the bolts as shown. Position the unit slightly lower than plumb (approx. 2 – 4 degrees down) pointing toward the upstream traffic.



Adjusting Radar

Note: The radar's rotational bolt is located on the backside of the panel.

6. Install antenna cable



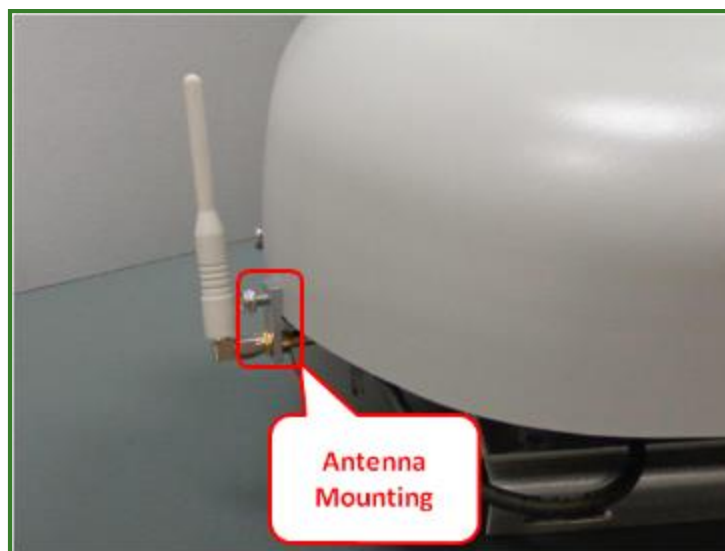
Attaching Antenna

7. Install Vantage Vector™ front and rear shrouds by engaging the shroud hooks into the frame then fasten the shroud screws ¼ turn.



Installing Shroud

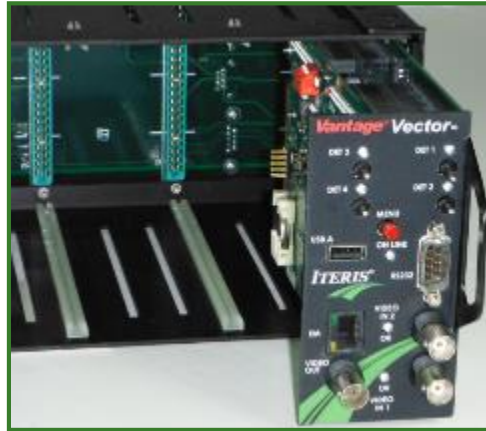
8. Attach antenna to shroud



Attach Antenna

3.2 Processor Installation

1. In the cabinet, slide-in and connect the Vantage Vector™ processor into the detector rack.



Installing Processor

2. Attach a video surge protector then connect the coax cable from the camera unit to the **Video In**.







Attaching Coax to Processor Video In

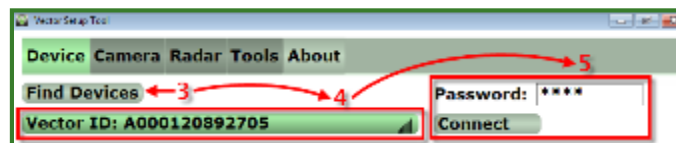
3. Power on the system (camera and processor units).

4. PC SETUP TOOL

The Vantage Vector™ PC Setup Tool provides a simple application which allows you to wirelessly manage the settings for your mounted cameras and radars.

1. Power on the Vantage Vector™ setup tool.
2. Open the **Vector Setup Tool** by double-clicking on the desktop icon .
3. Click **Find Devices** until your devices are listed.
4. Select a unit (S/N) from the list.
5. Enter the **Password** and click **Connect**.

 **Note:** The default password is **0000**.



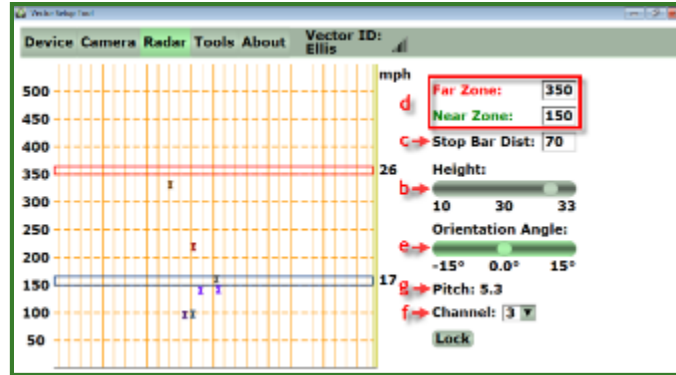
Connecting to Unit

6. Navigate to the **Camera** tab.
 - a. Click **Unlock** then click the play button to view the cameras snapshots.
 - b. Adjust the **Zoom**, then click **Auto Focus** and **Save** before proceeding.



Adjusting Camera Zoom & Focus

7. Navigate to the **Radar** tab.



Adjusting Radar

- a. Click **Unlock**.
- b. Set the unit's approximate **Height** from the ground with the slider.
- c. Wait for radar vehicle icons to stop, then identify the stop bar distance on the grid and enter the **Stop Bar Dist** value. Press **Enter** to save.

Note: Physically adjust the radar to so that the vehicle icons appear within the radar grid. Make sure vehicle icons stop on the grid at a reasonable stop bar distance that you can then set.

- d. Enter the **Near Zone** and **Far Zone** trigger distances then press **Enter** to save. Verify that the radar vehicle icons are visible before the far trigger and after the near trigger.

Note: The near and far zone trigger distances are only sent to the sensor after the **ENTER** button is pressed.

Important: The near and far trigger distances entered into the setup tool are for performance verification only. These settings are not transferred to the Vector processor. See [Section 6: PROCESSOR SETUP](#).

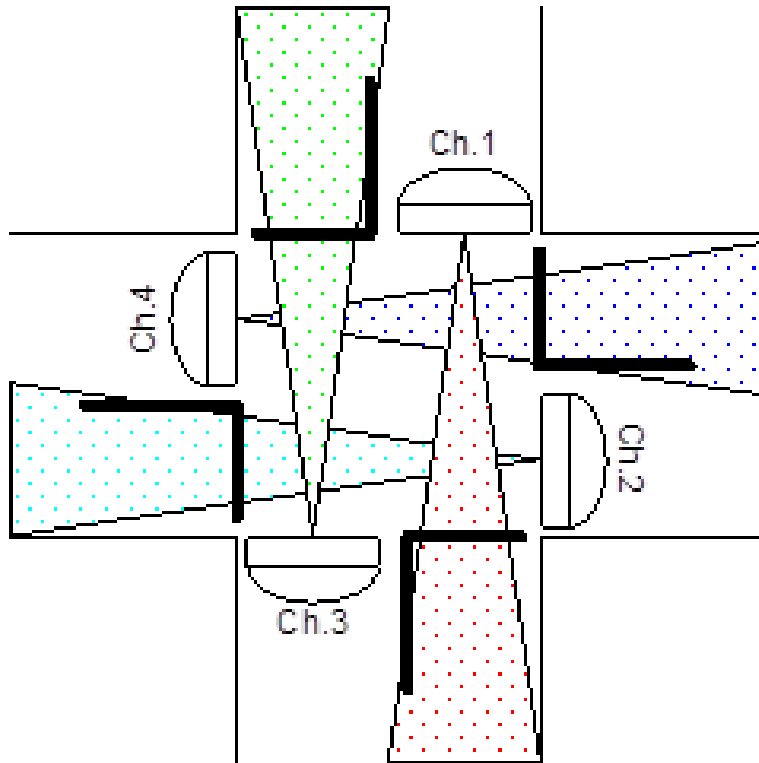
- e. Use the slider to enter the **Orientation Angle**. Adjust so that the radar vehicle icons are travelling relatively vertically on the screen.

Note: For installations where the sensor head is offset from the center of the roadway, vehicles will appear to flow diagonally across the screen. Use this setting to correct for this offset and have vehicles move straight down the screen.

- f. If using multiple Vectors at a single intersection, set each Vector to a different channel number (1 thru 7).

Caution: The new radar channel number does not take effect until power is cycled on the Vector sensor head.

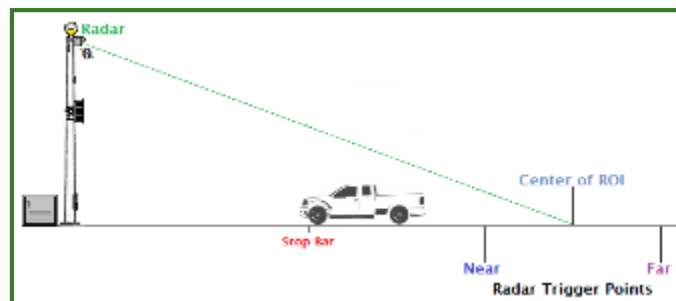
Caution: Failure to set multiple radars to different channels may cause radar to radar interference and a possible loss of performance.



Recommended channel settings for a multi-Vector installation

- g. Note the recommended **Pitch** angle for the radar then watch the radar vehicle icons and physically adjust (fine tune) radar if needed.

Note: Generally, a relatively fine physical adjustment is all that is required.



Adjusting Radar's Pitch Angle

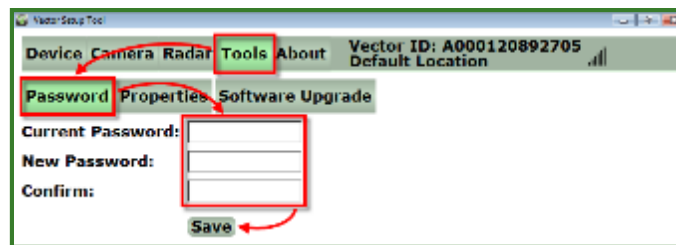
h. Click **Lock** when completed.

8. Navigate to the **Tools** tab and click **Properties**.

a. From **Password**, enter the **Current Password** (default password: **0000**) then set a **New Password** and click **Save**.

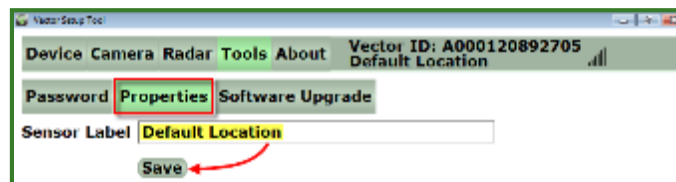
Important: A lost password cannot be recovered within the field. Be sure to note and save the new password before proceeding.

Note: The password must contain a maximum of 10 characters and a minimum of 4 characters using upper and/or lower case alpha (A-Z) characters and/or numerical (0-9) characters. Special characters, dashes and periods CANNOT be used.



Saving New Password

b. From **Properties**, enter a new **Sensor Label** and click **Save**.




Saving New Sensor Label

5. iPad SETUP TOOL

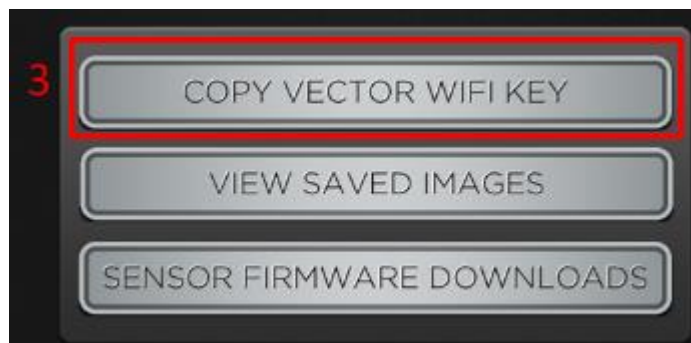
The Vantage Vector[®] Tablet VST provides a simple application which allows you to wirelessly manage the settings for your mounted cameras and radars.

5.1 Connecting to a Vector System for the first time.

1. Power on the Vantage Vector[®] Tablet VST.


2. Start the **Vector VST** app by tapping on the icon .

3. Tap the **Copy Vector Wi-Fi Key**, this stores on the Wi-Fi key on the clipboard.



Copying the Wi-Fi key

4. Minimize the Vector VST app by tapping the **Home** button.

5. Start the Setting App by tapping on the icon .

6. Select Wi-Fi.

7. Select a Vector Sensor from the list.



Selecting the Vector Sensor

8. The Enter Password screen will appear.
 - a. Press and hold the Password area until the Paste balloon appears. Tap on the balloon.
 - b. The Wi-Fi key will be copied into the area.
 - c. Tap on the **Join** button.



Pasting the Wi-Fi key

9. Tap on the arrow next to the Vector Sensor to display the network settings.



Network Settings

10. On the Network Setting screen.
 - a. Select Static.
 - b. Enter 192.168.1.10 in the IP Address.
 - c. Enter 255.255.255.0 in the Subnet Mask.
 - d. Tap the Wi-Fi- Networks button.



Setting the Network Address

11. Exit the Settings screen and return to the Vector VST app.
 - a. Enter the **Password**.
 - b. Tap the **Connect Icon**.



Connecting to Unit

✓ **Note:** The default password is **0000**.

12. Once a connection is made to the Vector system the connection icon will turn green and the Vector name will appear in the top right corner of the app.



Connection made to a Vector Sensor

5.2 Re-connecting to a Vector System



1. Start the Setting App by tapping on the icon.
 - a. Select Wi-Fi.
 - b. Select a Vector Sensor from the list.
 - c. The iPad will connect to the Vector Sensor.
2. Start the Vector VST app.
 - a. Enter the **Password**.
 - b. Tap the **Connect Icon**.

5.3 Camera Functions

1. Navigate to the **Camera** tab.
 - a. Slide the **Unlock** control.
 - b. Tap the **Play** button to view the cameras snapshots.
 - c. Tap the **SnapShot** button to store the image on the tablet.
 - d. Adjust the **Zoom**, by moving the slider or by tapping the + or – buttons.
 - e. Tap **Auto Focus**.
 - f. Tap **Save** before proceeding.
 - g. Slide to **Lock** when completed.



Camera Zoom & Focus Adjustments

5.4 Radar Functions

1. Navigate to the **Radar** tab.
 - a. Slide the **Unlock** control.
 - b. Set the unit's approximate **Height** from the ground from the drop down box.
 - c. Wait for radar vehicle icons to stop, then identify the stop bar distance on the grid and enter the **Stop Bar Dist** value.

Note: Physically adjust the radar to so that the vehicle icons appear within the radar grid. Make sure vehicle icons stop on the grid at a reasonable stop bar distance that you can then set.

- d. Enter the **Near Zone** and **Far Zone** trigger distances. Verify that the radar vehicle icons are visible before the far trigger and after the near trigger.

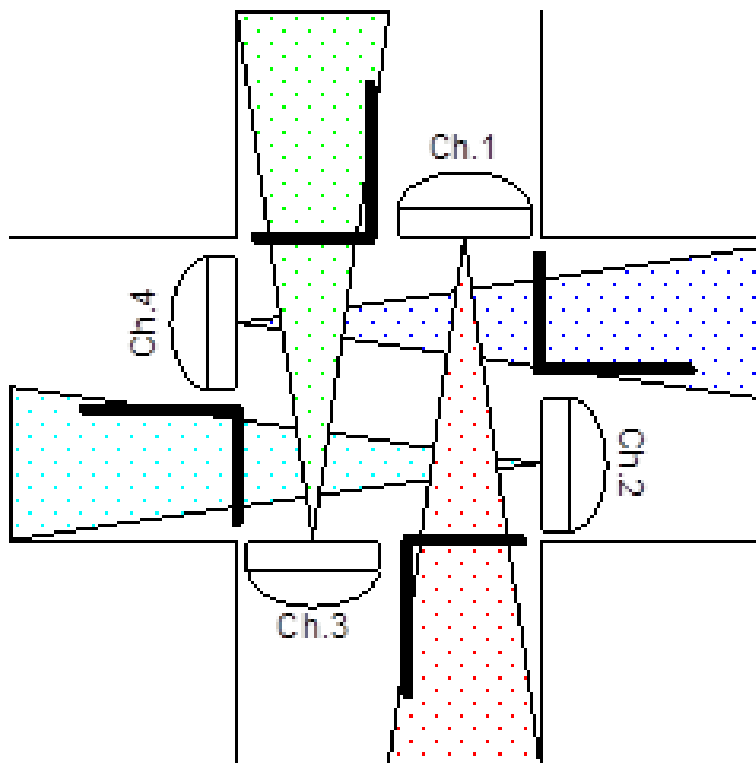
Note: near and far zone trigger distances are only sent to the sensor after the **ENTER** button is pressed.

Important: The near and far trigger distances entered into the setup tool are for performance verification only. These settings are not transferred to the Vector processor. See [Section 6: PROCESSOR SETUP](#).

- e. If using multiple Vectors at a single intersection, set each Vector to a different channel number (1 thru 7).

Caution: The new radar channel number does not take effect until power is cycled on the Vector sensor head.

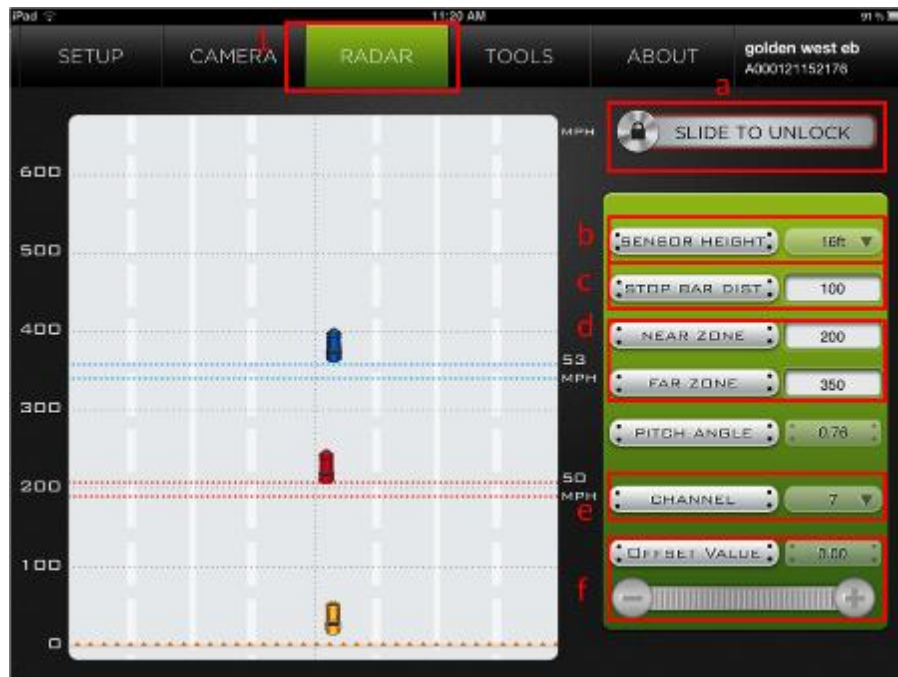
Caution: Failure to set multiple radars to different channels may cause radar to radar interference and a possible loss of performance.



Recommended channel settings for a multi-Vector installation

- f. Use the slider to enter the **Orientation Angle**. Adjust so that the radar vehicle icons are travelling relatively vertically on the screen.

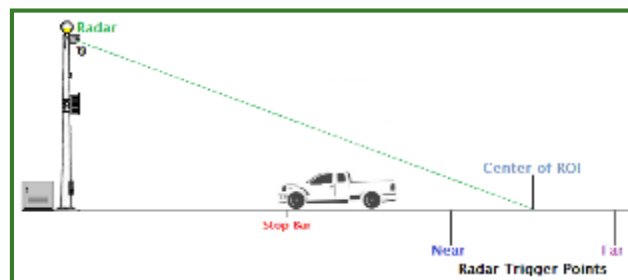
✔ **Note:** For installations where the sensor head is offset from the center of the roadway, vehicles will appear to flow diagonally across the screen. Use this setting to correct for this offset and have vehicles move straight down the screen.



Radar Adjustments

- g. Note the recommended **Pitch** angle for the radar then watch the radar vehicle icons and physically adjust (fine tune) radar if needed.

✔ **Note:** Generally, a relatively fine physical adjustment is all that is required.



Adjusting Radar's Pitch Angle

- h. Slide to **Lock** when completed.

5.5 Tools

1. Navigate to the **Tools** tab and tap **Settings**.
 - a. Enter a new **Sensor Label** and tap **Save**.
 - b. Enter the **Current Password** (default password: **0000**) then set a **New Password** and tap **Save**.

Important: A lost password cannot be recovered within the field. Be sure to note and save the new password before proceeding.

Note: The password must contain a minimum of 4 characters and must not exceed 10 characters, use upper and/or lower case alpha (A-Z) characters and/or numerical (0-9) characters. Special characters, dashes and periods cannot be used.



Vector Settings

5.6 Other Functions

1. Snapshots taken at the intersection can be viewed anytime by tapping the **View Saved Images** button.
2. Download new firmware for the Vector sensor by tapping the **Sensor Firmware Downloads** button.

Note: You must be connected to the internet and not a Vector sensor when checking for firmware upgrades.



3. Upgrading the Vector sensor.
 - a. Select the **Firmware** screen on the **Tools** page.
 - b. The system reports the current Vector Firmware Version.
 - c. Choose a file and tap the **Upload** button.



4. About Screen provides information on Vector VST and Vector Sensor versions.



6. PROCESSOR SETUP

From the Vantage Vector™ Processor installed in the cabinet, you can further fine tune the camera and radar settings as well as create your video detection zones.

There are two modes of operation in the Vector system.

1. Trip Line Mode
2. Group Mode

Both Modes run independent of each other and can be used simultaneously.

6.1 Accessing the Menu

1. On the Vantage Vector™ Processor, press and hold then release the red Menu button to bring up the menu on the monitor.



Opening Processor Menu

2. Using the mouse connected into the USB port, click Cam (camera) → Alt Sensor 1 (camera video 1) or Alt Sensor 2 (camera video 2, only on a dual video processor).

Note: *If using a two camera processor, make sure you are at the correct approach before accessing that camera's menu mode.*



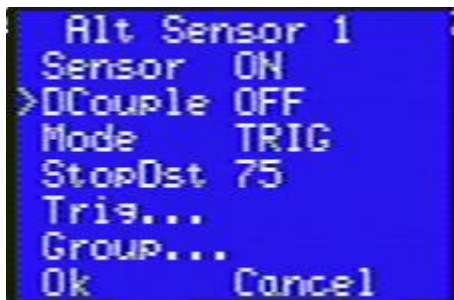
Selecting Alternate Sensor

3. Click Sensor to turn the sensor ON.

6.2 Programming Trip Line Mode

In Trip Line mode multiple trip lines can be programmed to supply an output when a vehicle crosses a point at the approach.

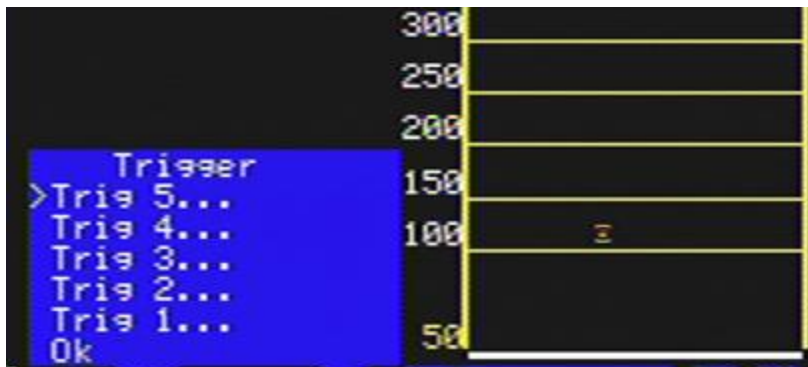
- Each trip line can be programmed to only output a call if the vehicle speed is between certain speeds (minimum and maximum)
- Each trip line can be programmed for a specific tolerance (width). The system will output a call all the time any vehicle is within this detection area (if the vehicle is within the speed limits)
- Trip Line 1 will record CSO information and should be set to the position nearest the stop line for highest accuracy.



1. Enter the **StopDst** for the stop bar.

Note: Set this to the same value as you previously set in the Vantage Vector™ setup tool screen.

2. Select the **TRIG** mode



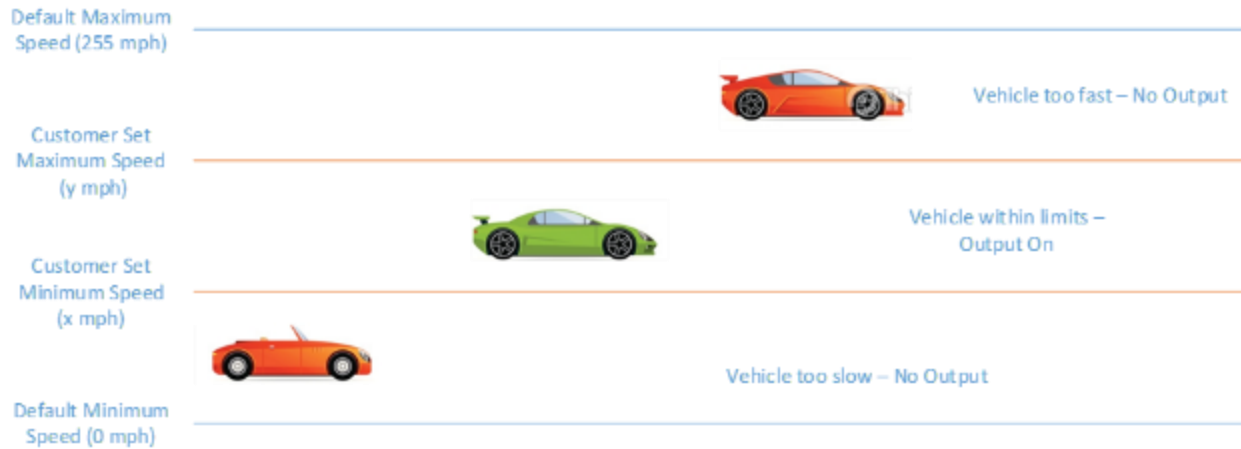
3. Select a Trigger (Trip Line).



4. Select each Trigger point and set the **Type**
 - a. The trip line triggers can be set to PRES (presence), EXT:30 (Extension) or DEL:30 (Delay) modes. These operate the same as the video detection modes. Please refer to the Edge2 User Guide for more details on these functions.
5. Enter the **Dist**.
 - a. This is the distance from the stop bar you want the Vector to activate.
6. If desired, enter a speed value for **MinSpeed** and **MxSpeed**.
7. If desired enter a tolerance value.
 - a. This is the distance (in feet) either side of the trip line that the Vector will activate.

Note: The default min speed setting is 0mph and the max speed setting is 255mph. This ensures all vehicles provide an output. To restrict the output to vehicles only travelling a certain speed set the min and max speeds. See diagram below.

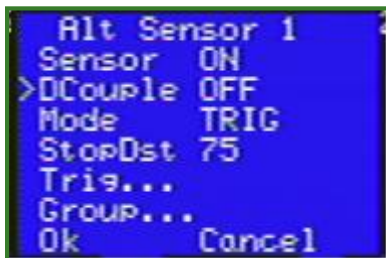




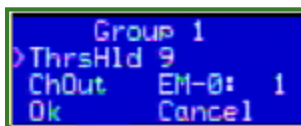
8. Assign the output **ChOut**.
9. Click **Ok** to repeat for the other trip lines.
10. Click **Ok** twice to exit to the main menu when you have completed the Trigger Line setup.

6.3 Programming the Group Mode

The Group mode will output a call anytime the total number of vehicles detected by the radar exceeds a programmed threshold. This function can be used to supply information on platoons approaching the intersection for various applications.



1. Select the **Group** mode
2. Enter the ThrsHld
3. Assign the output **ChOut**.

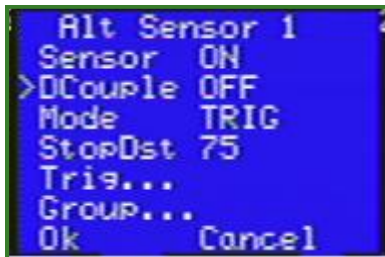


6.4 Decouple Option

This option enables and disables the link between the Radar and Video functions in the system. When enabled the system continuously monitors that when the radar sensor detects a vehicle that at some point shortly after one or more of the video zones produces a detection.

If a situation arises when this does not occur regularly over a period of time the system assumes that something is blocking the video image. At this point the system will turn on the detection output associated with the video zones nearest the stop line while the radar sensor detects vehicles. The 'F' Flag will be displayed on the screen to indicate this Fallback Mode is active. In this way the intersection can work at some level of efficiency. The system continues to monitor the situation and will revert to normal operation when the video system detections return to normal.

There may be occasions when this mode will inhibit the correct function of the system and so an option to turn of this function is offered.



1. Select the **DCouple** mode and toggle **ON** or **OFF**.

6.5 Completing the Programming

1. Verify the radar vehicle icons are correctly travelling down the screen.



Verifying Operation

2. Click **OK** to exit to the main menu when you have completed the setup.
3. Save the configuration by clicking **Q** at the far right of the menu and then select Config 1, Config 2 or Config 3.

Note: Add video detection zones similar to the setup that is performed on a typical Edge[®] system. Refer to the **Vantage Edge[®] User Guide** for steps on how to add video detection zones.



Saving Configuration

7. RUN TIME DISPLAY

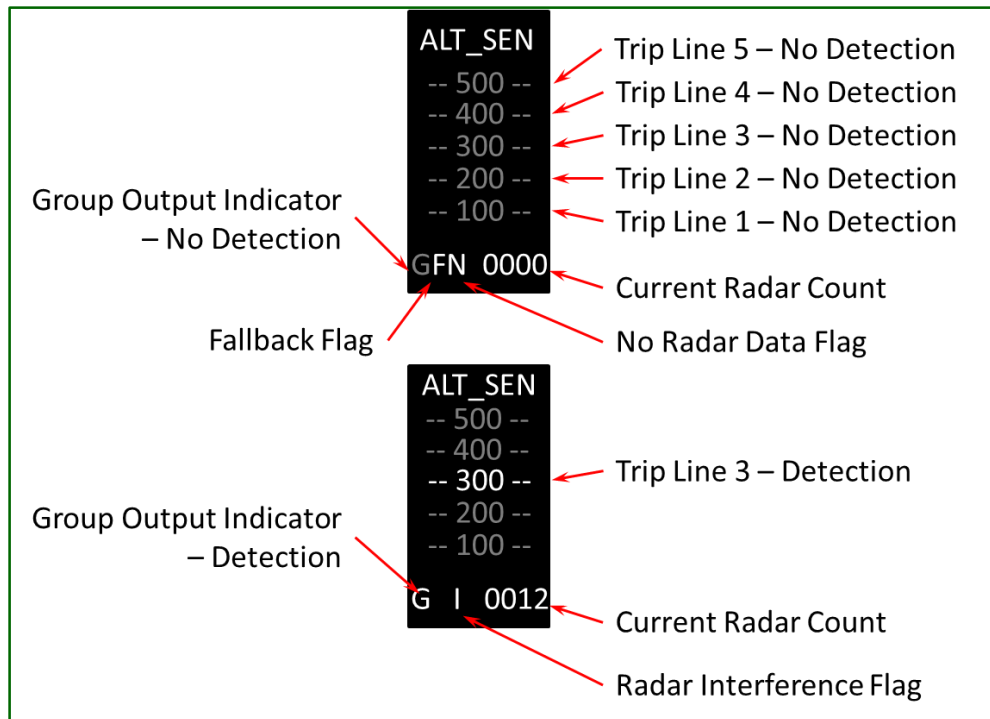
During normal operation the system will display information on the radar in the upper left corner of the screen. This box contains various information.



Radar Sensor Display

Trigger Line Mode

The system displays the three trip line distances. When no vehicles are present at that point on the approach then the distance is gray and the associated output is off. When a vehicle passes that point on the approach then the distance turns white and the associated output is activated.



Counts

The current count of vehicles at Trip Line 1 will be displayed. This will reset based on the time set for the Bin Interval in the system.

Flags

G – This flag indicates if the Group Threshold has been exceeded and the output activated. It is dark gray when the output is off and white when on.

F – This indicates that the Fallback mode is active and the video outputs are being triggered by the radar data.

 **Note:** *See Section 6.5 Decouple Option for more information on this function.*

N – This flag indicates that no data is being received from the radar sensor. Troubleshoot the system to determine the issue.

I – This flag indicates that the radar is seeing high levels of interference in its frequency operating range. Troubleshoot the system to determine the issue.

8. TROUBLESHOOTING - FAQ

The following information contains tips and suggestions for Vantage Vector™ installation.

Symptom A: No Video Displayed on Monitor in Cabinet

Use the checklist below to troubleshoot an issue with the cabinet’s video display not working:

1. Check AC power connections on Vantage Vector™ unit.
2. Make sure the unit is receiving AC power.
3. Verify the circuit breakers are on.
4. Check unit’s video coax cable termination.
5. Ensure the video board is plugged securely into the unit’s main VDE board.
6. Check BNC connection inside of the cabinet.
7. Run video cable directly to the monitor, bypassing the processor and surge protection.
 - a. If video appears, the processor or surge protection is at fault.
 - b. If no video is present, then the coax cable or connectors are at fault.
8. Ensure the braided shield on the coax cable is not coming in contact with the coax center conductor
9. Ensure the braided shield was not removed when stripping the coax cable

✓ or ✗

Symptom B: Reduced Radar Range

Tilt the Vantage Vector™ radar unit up slightly. This small adjustment will increase the radar’s range if it is pointed to far down towards the stop bar. Be sure to keep the tilt adjustment minimal. You may need to verify the radar’s settings are correct using the setup tool and processor menu after making a physical adjustment to the radar’s tilt, refer to [Section 4 and 5: SETUP TOOL](#) and [Section 6: PROCESSOR SETUP](#) to learn more.

Symptom C: Vehicles Dropped by Radar Before they Reach the Stop Bar

1. Tilt radar unit down slightly then verify that the vehicles reach the stop bar on the radar screen. Ensure the radar’s settings are correct using the setup tool and processor menu after making a physical adjustment to the radar’s tilt, refer to [Section 4 and 5: SETUP TOOL](#) and [Section 6: PROCESSOR SETUP](#) to learn more.
2. Check the near and far speed settings in the processor, refer to [Section 6: PROCESSOR SETUP](#). The speed limit that is set within the processor will direct the radar to ignore vehicles traveling slower than that threshold.



Symptom D: Setup Tool is Unable to Connect to Unit

1. Make sure Vantage Vector™ antenna is attached to shroud and pointing upward.
2. Move the antenna so it is mounted on the cabinet side of the Vector unit.
3. Move closer to the Vantage Vector™ unit and try to connect again.

Symptom E: Excessive Glare in Video Image

Loosen screws and slightly move the Vantage Vector™ camera's sunshield forward. This will help reduce the glare in the image.

9. TECHNICAL INFORMATION

Belden Coax 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. (V)	Nom. Vel. 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 [▲] 1000	152.4 304.8	37.5 74.0	17.0 33.6	20 AWG (solid) .031 BC 9.9W/M 32.5W/km	.198 5.03	TC Double Braid 98% Shield Coverage 1.1W/M 3.6W/km	.305 7.75	75 66%	21.0 68.9	1 3.6 10.0 71.5 135 270 360 540 720 750 1000	66%	21.0 68.9	1 3.6 10.0 71.5 135 270 360 540 720 750 1000	.3 .5 .8 2.1 3.0 4.3 5.1 6.3 7.4 7.6 9.2	1.0 1.6 2.6 6.9 9.8 14.1 16.7 20.7 24.3 24.9 30.2	

▲500 ft. put-up not available in White.
Max operating voltage — Non UL 2500V RMS

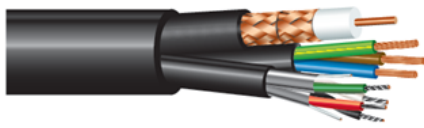
Power Cable

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

VIDEO DETECTION CABLE

Composite Camera Cable



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>

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”

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

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 ⁽¹⁵⁾	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).

⁽¹⁵⁾Actual shipping weight may vary.



Vantage[®] Vector[®] User Guide



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.

10. 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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