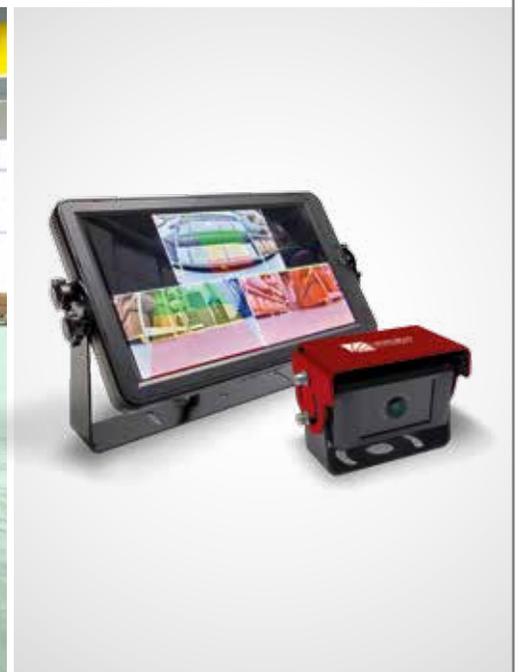




Instruction Manual

SmartEye Detect- Visual Pedestrian Detection System



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Introduction

Thank you for purchasing the SmartEye Detect - Visual Pedestrian Detection System from Laserglow. This fixture utilises cutting edge AI technology to prioritize pedestrian safety around material handling equipment. The advanced Ai algorithm detects moving and static pedestrians, in real time, and alerts the material handling equipment operator of the presence of such hazards. This manual contains complete instructions on how to set up and operate your SmartEye Detect, descriptions of all features, and some troubleshooting tips. If after reading this manual you still have questions about the safe and proper operation of your product, please contact us and we would be happy to assist you. Our contact information is listed at the bottom of this page.

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1. What Is SmartEye™ Detect?

The SmartEye™ Detect utilises cutting edge AI technology to prioritize pedestrian safety around material handling equipment. The advanced AI algorithm detects moving and static pedestrians, in real time, and alerts the material handling equipment operator of the presence of such hazards. This ability makes the SmartEye Detect one of the most advanced pedestrian detection systems available. The system is usually installed with one rear facing camera however it can also be integrated to accommodate side and front facing cameras to give complete 360° coverage around the vehicle. When a pedestrian is detected, a signal is sent in real time to the monitor to visually and audibly alert the operator on the impending danger. This system does not rely on the use of any wearables like tags or high visibility vests to detect pedestrians.



2. Safety Information

The SmartEye™ Detect system is designed to be used in conjunction with existing safety practices by providing relevant information to the driver which could help them with maneuvering their vehicle. It is not an alarm system and it does not reduce the responsibility of the driver or other staff in case of a collision. The SmartEye Detect system is designed to supplement the usual safety practices already implemented. It must be integrated into a comprehensive safety policy taking into account the risk factors that are specific to the activity of the company. Vehicle control and safety of operations remains the responsibility of the Operator and the authorities in charge. **THIS SYSTEM DOES NOT GUARANTEE A 100% RECOGNITION RATE.**

- Avoid dropping or striking any components of the system.
- Never puncture, scratch or use abrasive cleaning materials on this system.
- Do not place cables where they may be pinched, stepped on, run over, or dragged.
- Working voltage: 10-32V. Voltages below 7V may cause the device to be permanently damaged.
- Make sure all cables are connected properly, especially power connection polarity. Improper cable connections may damage the device. Remove the power cable connections when you don't intend to use the system for an extended period.
- This product is safe driving auxiliary equipment, not a substitution for driver's operating actions during the process of vehicle driving.
- ⚠ This product is not for use with passenger vehicles or on public roads.
- ⚠ Do not obstruct the camera lens with objects. This will prevent proper system recognition of pedestrians.
- ⚠ After installing the device, calibration is recommended and may be required for proper operation of the system.
- ⚠ In case of any problems, please turn off the device and notify Laserglow or an authorized dealer.

3. Components

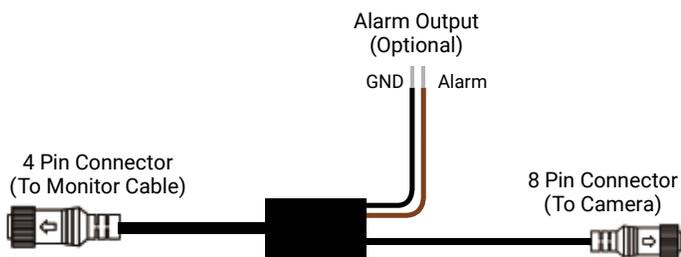
Component Photo



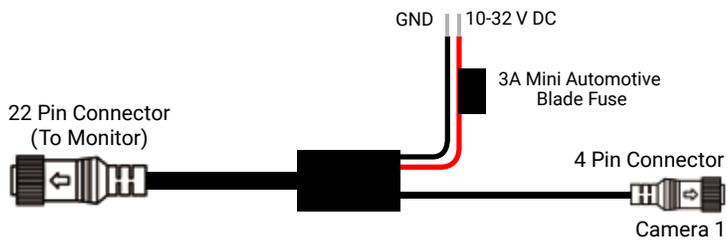
Name

Pedestrian Detection Camera

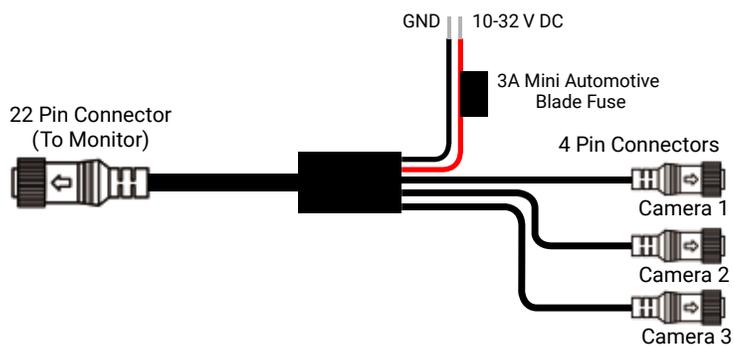
Camera Cable

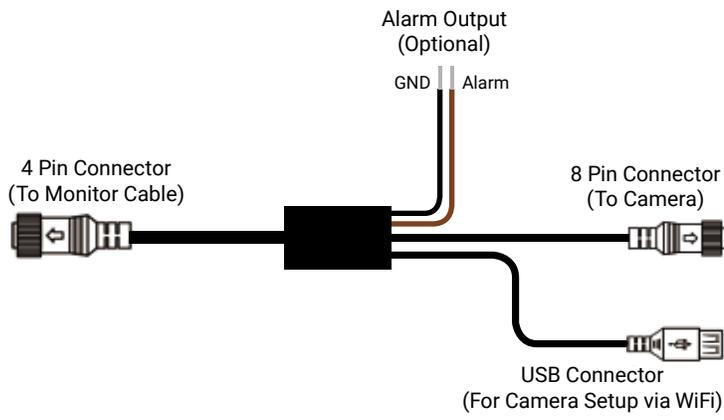


1 Camera Monitor Cable



3 Camera Monitor Cable





USB Camera Cable



Display



Wifi Module



U-Support Bracket



Center Mount Bracket



Sun shield



Camera Magnetic Bracket

Table 1 (Components)



4. Specifications

4.1. Camera

Dimensions	95 x 60 x 70 mm
Resolution	1920 x 1080P
Frame Rate	25 or 30
Video Output	AHD (1.0Vp-p, 750hm)
Viewing Angle	Front/side view: 52° (Horizontal) Rear view: 140° (Horizontal)
Communication Interface	USB 2.0
Cable Length	3 m
Power Supply	DC 10V - 32V
Power Dissipation (12V IN)	IP69K
Operating Temperature	-20~+70°C
Storage Temperature	-30~+80°C
Vibration Resistance	5.9G

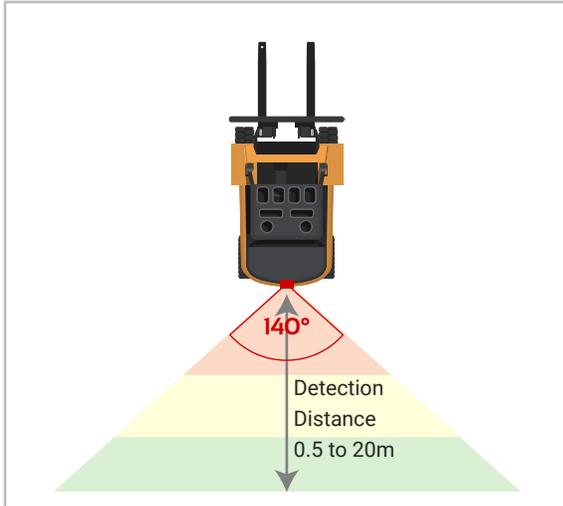
4.2. Display

Type	Large	Small
LCD Size	10.1"	7"
Resolution	1920x1080 (1080P)	
Outer Dimension	267 (W) x 159.5 (H) x 30 mm (T)	195 (W) x 116 (H) x 30 mm (T)
Viewable camera Feeds	Multi Feed	Single Feed
Operating Temperature	-20~+70°C, RH 90%	
Storage Temperature	-30~+80°C, RH 90%	
Screen Type	Capacitive Touch	
Volts	10 - 32V	
Consumption	MAX 25W	
Anti-Vibration	3g (Center mount bracket) / 7g (U-support bracket)	

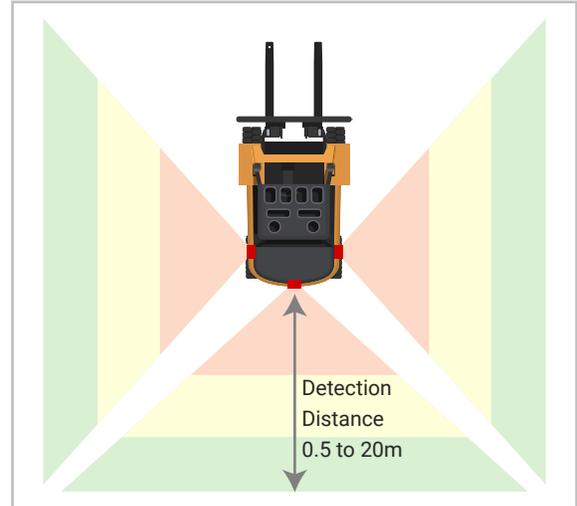
5. Installation

2 common ways to install the Smart Eye Detect system are shown here:

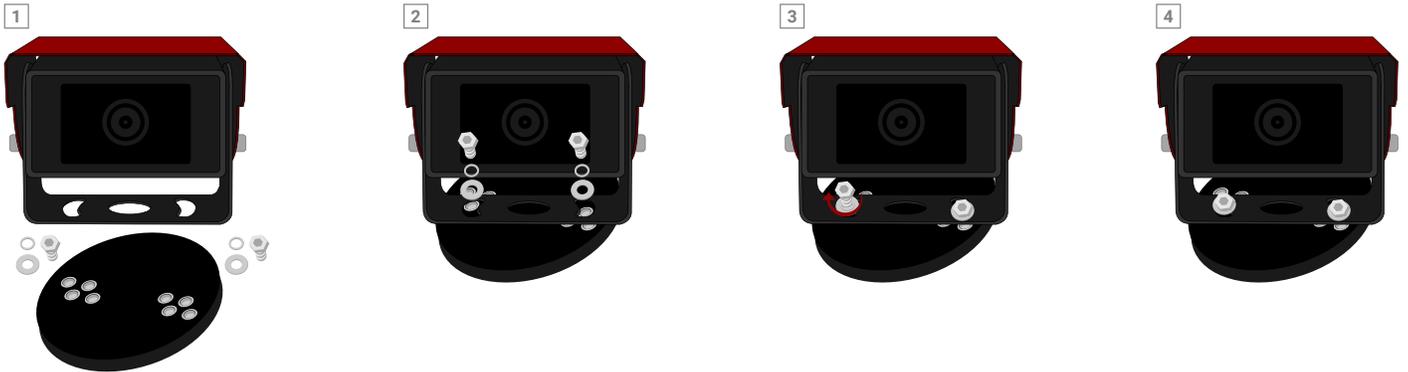
Single Camera Setup – Rear facing with 140° view



Tri Camera Setup – Rear and side mounted cameras



Installation - Camera Magnetic Bracket

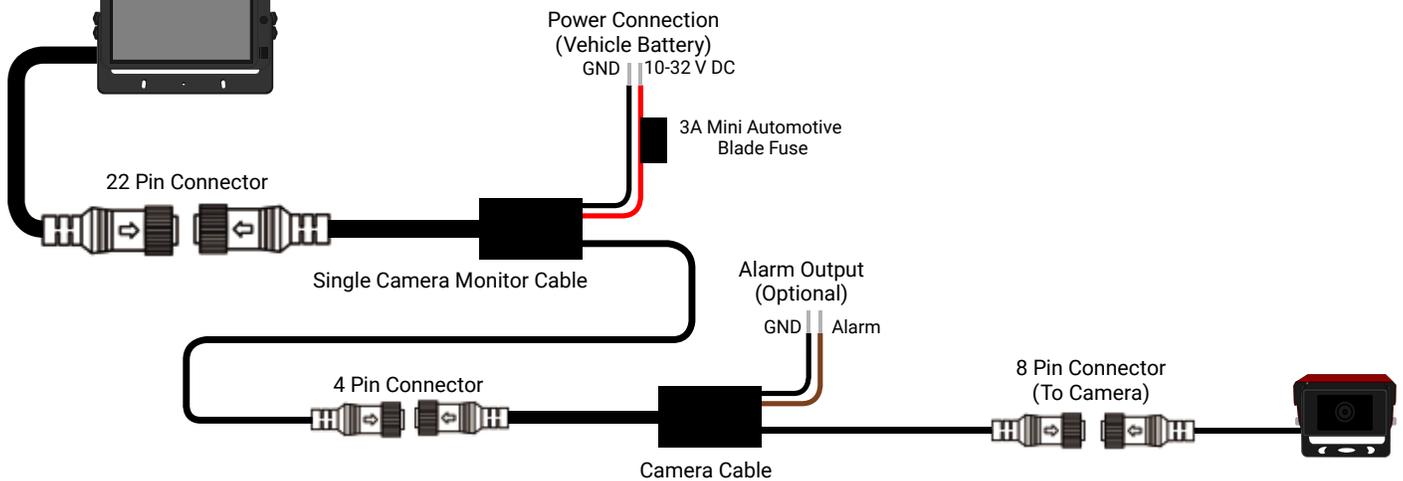


6. Power and Connections

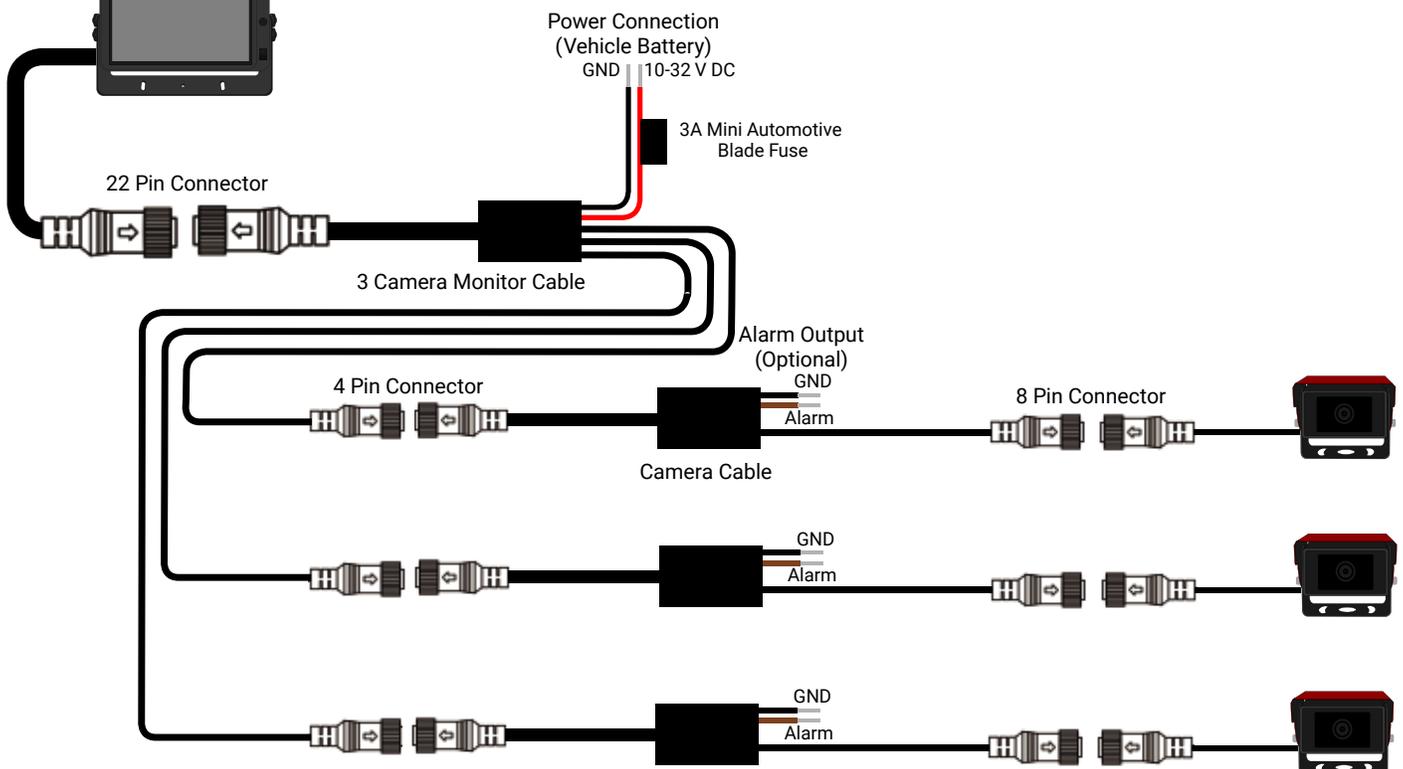
The Smart Eye Detect system accepts a voltage range between 10-32 Volts DC into the monitor cable. If the vehicle the system is being installed has an electrical system above 32 volts, a DC-DC step down converter must be used.

Power to the unit should always be connected through the included power leads on the monitor cable. This cable includes a 2 Amp inline fuse that should never be bypassed. Bypassing this fuse can cause serious damage to the unit or vehicle and may cause injuries to the vehicle operator.

Single Camera Wiring Diagram



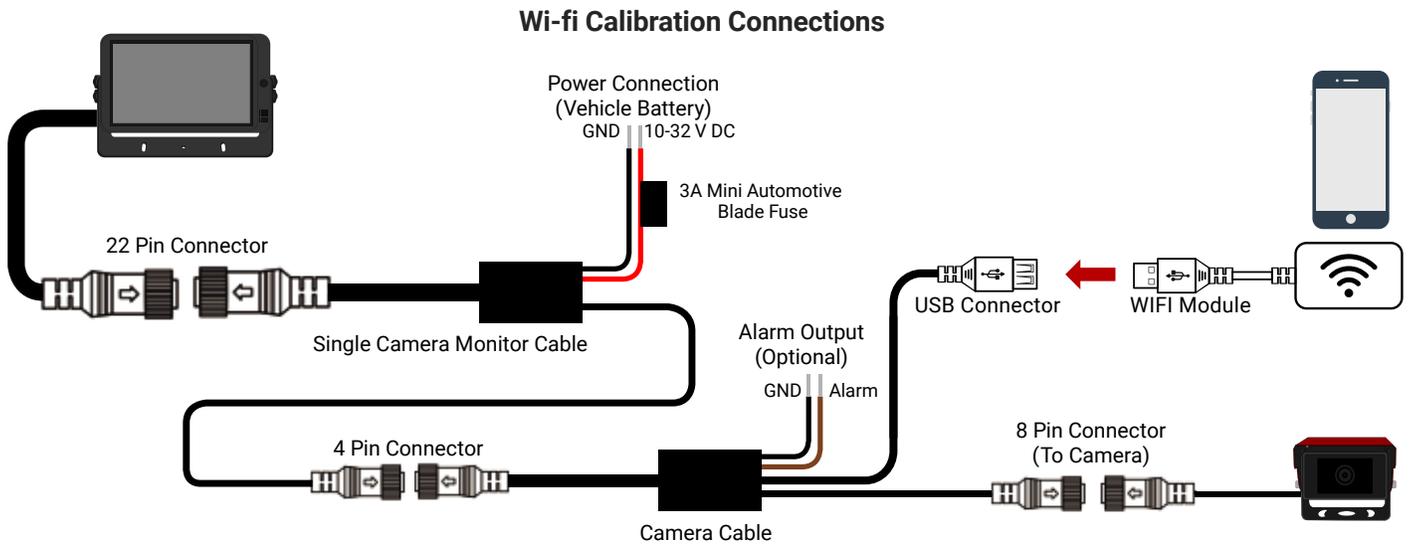
Triple Camera Wiring Diagram



7. Alarm Wire

Each Camera Cable has an alarm signal wire that can be utilized to trigger other systems within the vehicle, such as speed limiters, buzzers or lights. The alarm signal wire will output the same voltage as the power input when the connected camera is detecting a pedestrian, and will be an open circuit when there is no detection. This wire can only provide 10-15 mA and so cannot directly power other devices; use a relay to switch a larger electrical load where required.

8. Wifi Calibration Connections

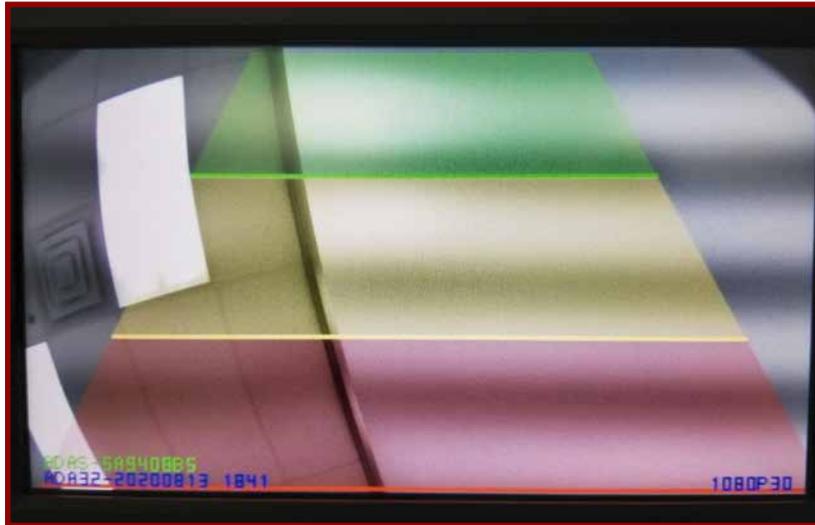


9. Calibration

9.1. Establishing a WIFI Connection

To calibrate and adjust the on screen detection zones, a wifi connection must be established using the included WIFI Module. A connection can be made using a phone, tablet or PC.

Step One - Connect Display to camera and WIFI dongle as shown in figure 2. Plug the WIFI module into the USB port and power on the system. A WIFI SSID will appear in the bottom left corner of the display.



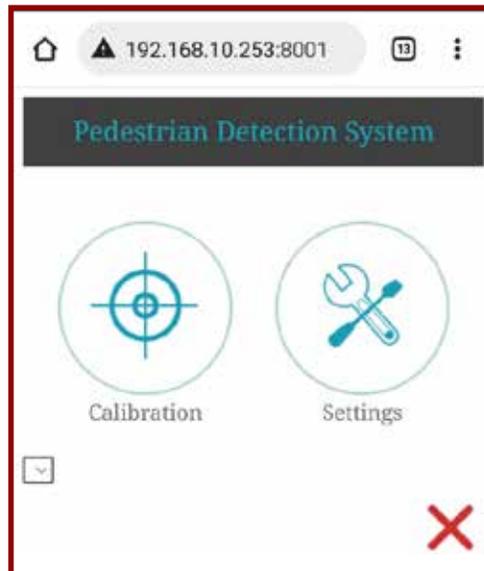
Step Two - Using a mobile device, Tablet or PC, connect to the WIFI module using the password "88888888".



Step Three - Open a browser and enter the URL "http://192.168.10.253:8001/" in the web browser of your device, or if a mobile phone is being used, the QR code below can be scanned.

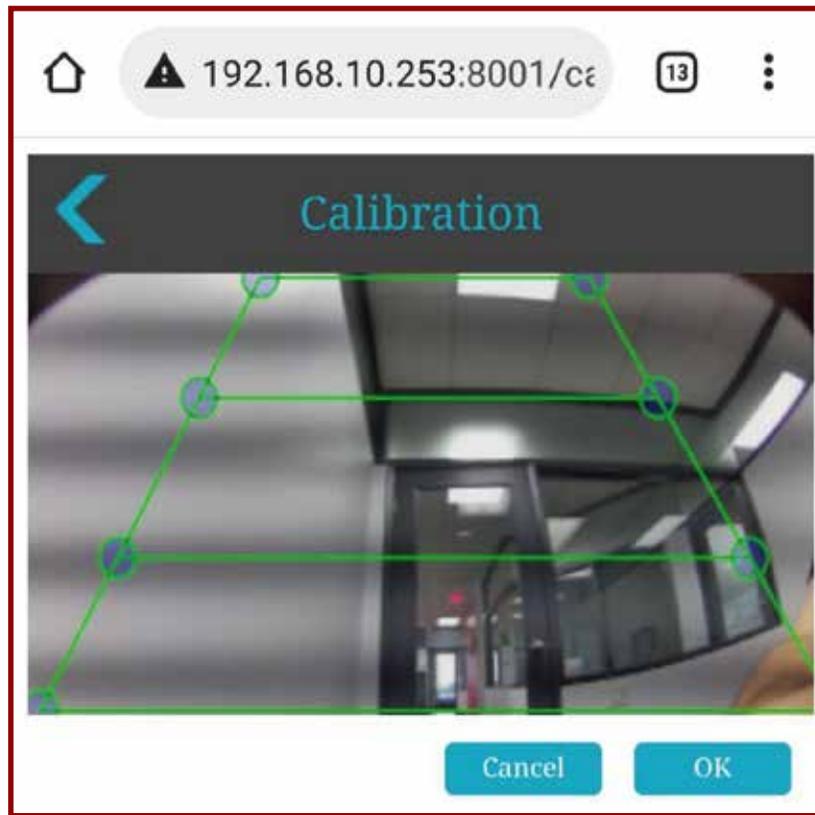


The screen viewed in the browser should look like this:

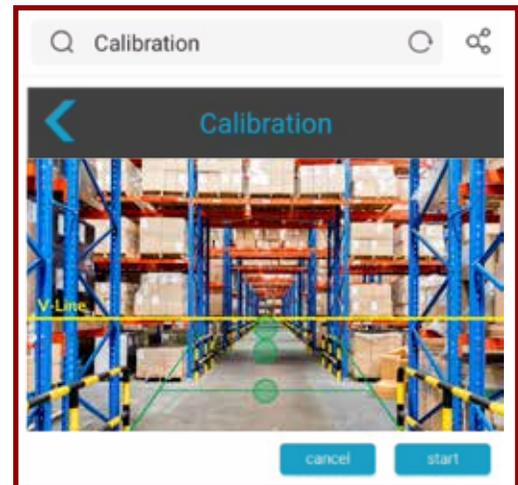
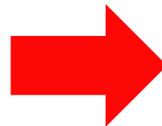
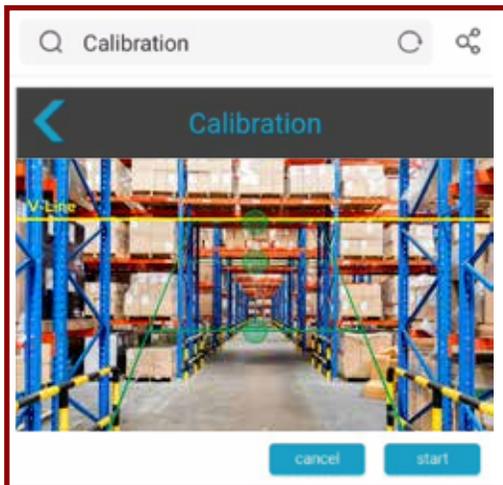


9.2. Calibrating the Detection Zones

Step One - enter the calibration screen by tapping the calibration button on the home screen.

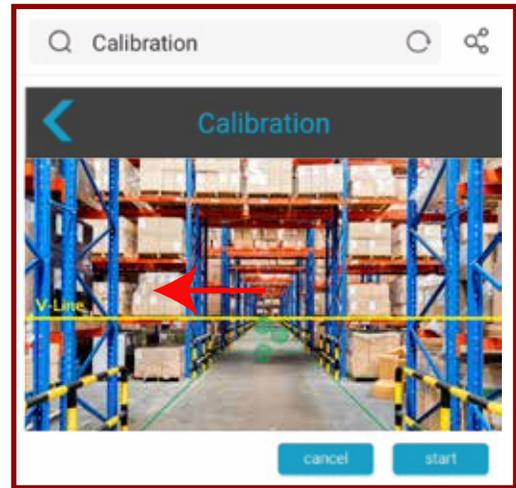
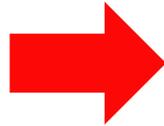
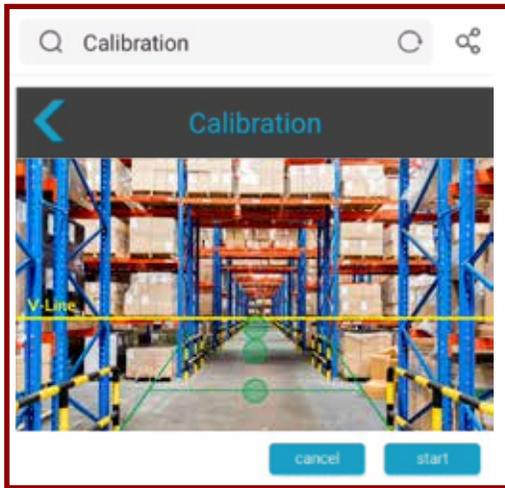


Step Two - This screen will show a set of vertical and horizontal lines that can be moved around to the desired detection zones required.



Step Three - The yellow “V-line” moves the Region of interest (ROI) around. The ROI encloses all three detection zones. The Green (farthest), Yellow (middle) and Red (closest) zones can be sized in any manner required by moving around the green dots and lines of each zone.

Step Four - after completing the calibration press the “Start” button on the bottom right to finalize the adjustments and save it on the system.



9.3. Pedestrian Detection Zones

The three detection zones have an audible signal associated with it. The red zone is the highest priority and will sound an alarm three times in a row.



The yellow zone is second in priority and will sound an alarm two times in a row.

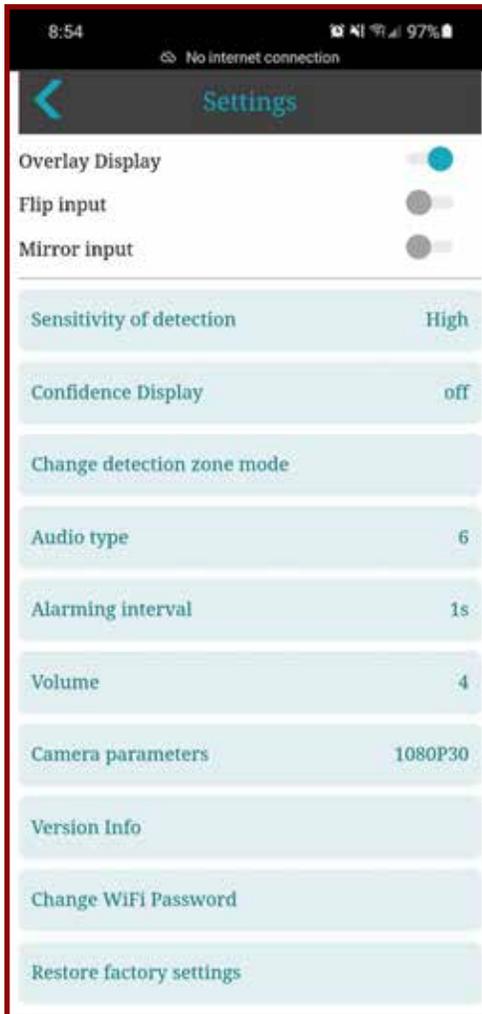


The green zone is last in priority and will sound an alarm once.



If a pedestrian is detected in multiple zones, the audible signal is that of the highest priority zone. For example if a pedestrian is detected in the green zone and red zone, the red zone signal will alert the driver.

9.4. Camera Settings

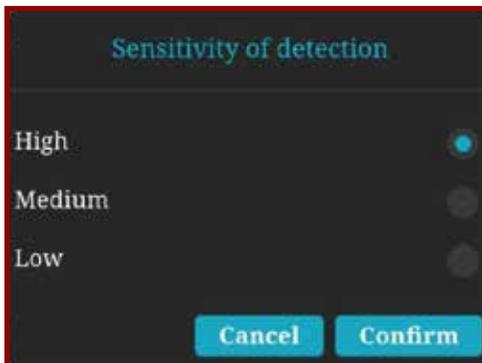


Camera Settings Menu

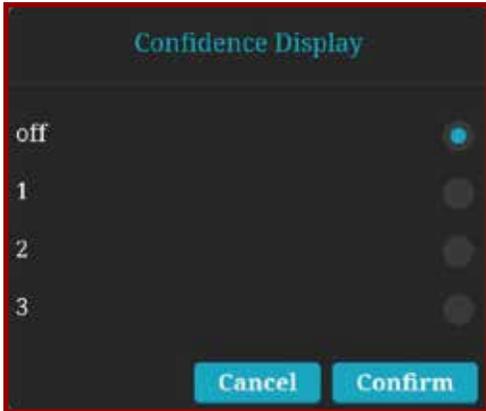
Overlay Display - show or remove WIFI SSID and other text from display.

Flip input - flips camera input vertically to allow the display to be mounted upside down.

Mirror input - flips camera input horizontally.



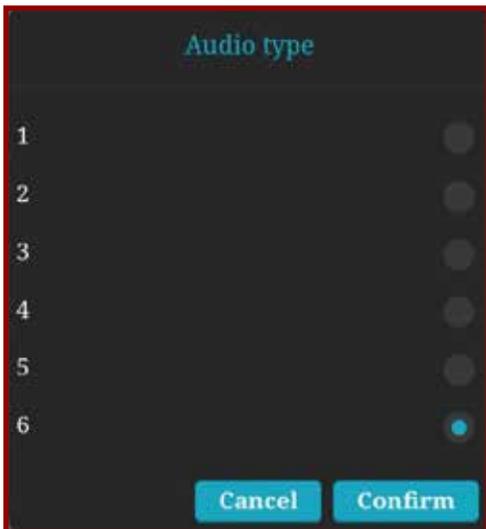
Detection Sensitivity can be adjusted from LOW to HIGH. This setting can be adjusted so that the camera doesn't give false alarms or if the camera isn't picking up pedestrians when it should.



The confidence display setting will show how confident the detection system is that the object in view is a pedestrian. The settings seen above remove or change the size of display text above the pedestrian.

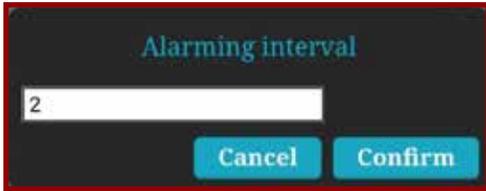


Detection zone display changes the style of the detection zones on the display for each camera. "Region" shows the red, yellow and green zones while "Line" shows just lines for bounding each region. Selecting "Hide" removes all of the regions or lines from the display.



The audio type changes the sound that will be heard during an alarm. Use this to choose the preferred alarm sound.

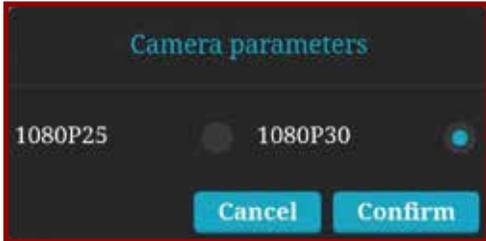




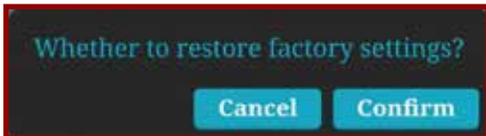
The alarming interval changes the time between each alarm. The interval can be set between 0-30 seconds.



Camera parameters change the frame rate of the camera between 25 and 30 frames per second.



The change wifi password menu is used to change the password to enter the calibration and settings through the wifi hotspot. This can be used to restrict access to the camera settings from those who aren't authorized.

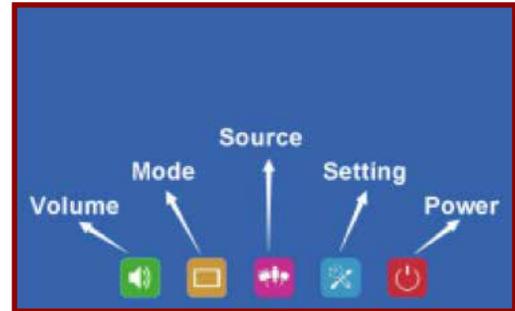
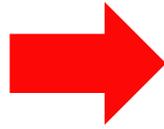
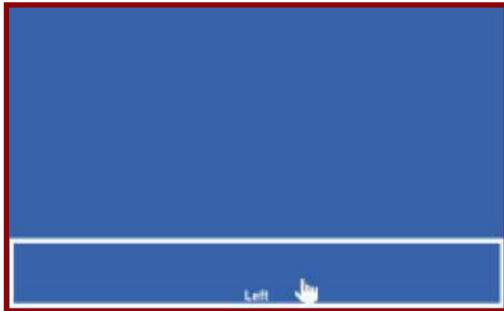


Restore factory settings enables a complete reset to the factory settings the cameras were set up with.

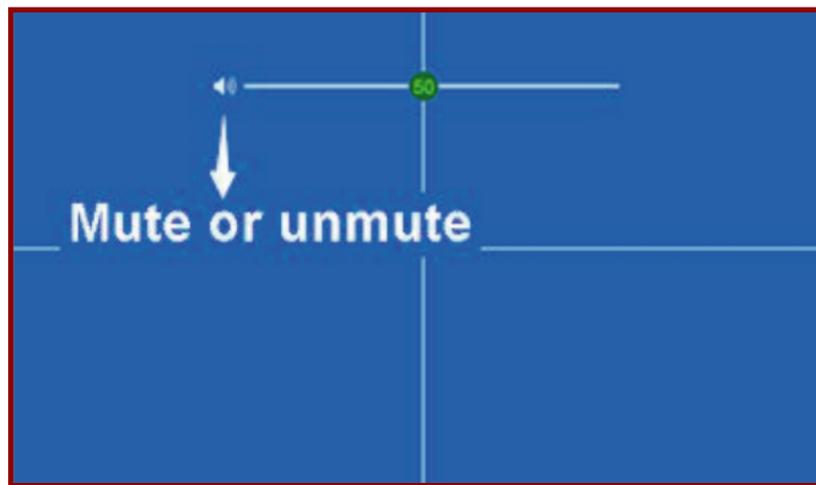
10. Display Settings

The Display settings can be changed using the touch screen.

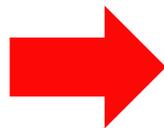
10.1. Touch Screen Settings



Touch anywhere in the lower white box to bring up the main menu.

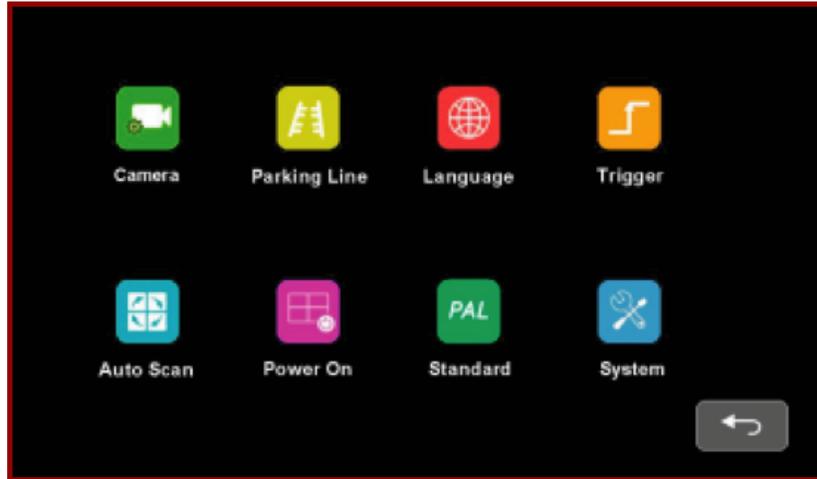


The volume can be adjusted using the display. The speaker icon allows the unit to be muted or unmuted.

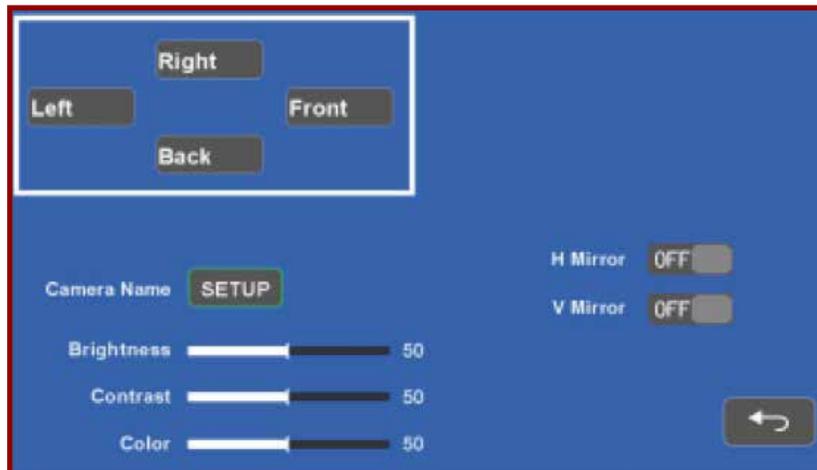


Touching the "Mode" button will bring up the camera feed settings.

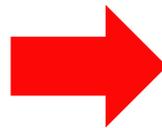
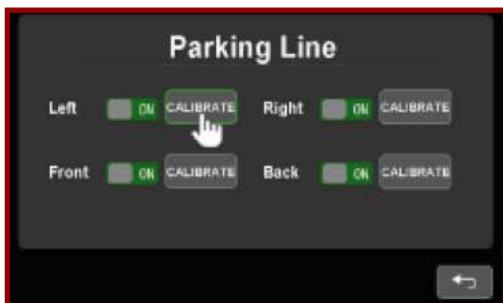
The 7" single camera feed options are shown on the left and the 10.1" camera feed options are on the right.



Pressing the "Setting" button brings up all system settings.



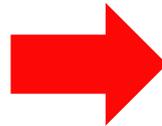
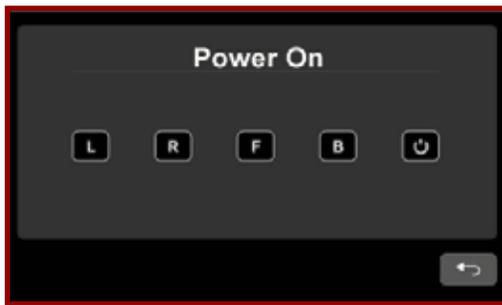
The image above illustrates the camera settings. Select each camera in the top left to adjust the settings.



If Parking assistance is needed, A parking line can be added to the rear view camera and calibrated to the vehicle it is attached to.



Language settings.



The "Power On" settings allow the start up mode of the system to be changed. Changing this setting will change what is displayed on the screen after the system is power cycled. The 7" options are shown on the right and the 10.1" options are shown on the left.

11. Pedestrian Detection Conditions

The SmartEye Detect system uses machine-learning and AI algorithms to detect the presence of pedestrians with a high degree of reliability and accuracy. However, the system does have limitations and may not detect pedestrians in all cases. It is crucial that vehicle drivers are aware of these limitations and so they must remain vigilant at all times while operating the vehicle. Ensure the camera sensors/windows are kept clean and free of debris, dirt and dust.

Postures

Pedestrians are most easily detected when standing or walking. Pedestrians may not be detected reliably when running, sitting, or laying down. Pedestrians that are partially obstructed by walls, railings, or boxes may not be detected.

Clothing

Pedestrians are more easily detected in dimly lit conditions when they are wearing high visibility clothing. If lighting conditions are good, any clothing can be worn.

Lighting and Environmental conditions

Dim lighting or darkness will interfere with the camera's ability to detect pedestrians. Use work lights, flood lights, and/or high visibility clothing to improve detection in poor lighting conditions, such as outdoors at night.

Strong backlights such as the sun being present in the camera field of view will reduce the camera's ability to detect pedestrians.

Environmental conditions such as thick smoke, fog, or steam that restrict visibility will reduce the camera's ability to detect pedestrians.

Warning zones and camera calibration

Pedestrians that are outside the red, yellow, and green highlighted areas on the display will be detected but will not cause an audible alert and will not trigger external warning devices (if equipped). Ensure the cameras are set up and calibrated correctly.

False Detections

Certain non-pedestrian objects may be erroneously detected as pedestrians. This is usually dependant on lighting conditions and image quality (dirty camera lens, dim lighting, reflections, low visibility, etc.). False detections may be caused by:

- Poles
- Gas cylinders
- Hanging clothes
- Life-sized pictures or silhouettes of people

12. Troubleshooting

The symptoms described below do not necessarily mean a failure within the display. Please check the following items before you initiate request for repair.

Symptoms	Possible Causes/Solutions
No picture, no sound	Improper connection of automobile adapter; Use of unauthorized power supply; The volume is set "0 " by mobile phone.
Can not login the web page	Confirm that the external Wi-Fi module is connected to the USB interface and make sure the Wi-Fi button is on.

13. Warranty Information

LIMITED PRODUCT WARRANTY:

Laserglow Technologies ("Laserglow") warrants that this product is guaranteed to operate within the stated specifications, free from defects in materials and workmanship, for a period of twelve (12) months from the date of delivery.

BEFORE RETURNING ANY ITEM FOR SERVICE, PLEASE CONTACT LASERGLOW TO RECEIVE A RETURN AUTHORIZATION (RA) NUMBER. ITEMS RETURNED WITHOUT AN RA NUMBER MAY INCUR DELAYS OR ADDITIONAL FEES.

LASERGLOW'S PLEDGE TO CORRECT PROBLEMS UNDER WARRANTY:

At its option, Laserglow will either repair or replace the in-warranty defective unit without charging the customer for costs of repair or replacement. When parts or products are replaced under warranty the replaced items will automatically become property of Laserglow. Once an item has been repaired or replaced under warranty, the repaired or replacement item assumes the remaining period of warranty based on the original date of delivery, plus the period of time during which the laser was out of the customer's possession. Within North America only, and within the first 30 days of the warranty period, Laserglow will cover the cost of shipping the defective item back to Laserglow and the cost of shipping the repaired/replacement item to the customer. After 30 days, or for overseas shipments, the customer will cover the cost of shipping the defective item back to Laserglow and Laserglow will cover the cost of shipping the repaired/replacement item to the customer. Where Laserglow covers the cost of shipping, the carrier and method of shipping will be at Laserglow's discretion. Items returned to Laserglow as warranty issues, which upon inspection are deemed not to have any defect, will incur a diagnosis service charge of \$119.

NOT COVERED UNDER THIS WARRANTY:

This warranty will become void if any of the following conditions are met:

- The product has been modified or tampered with in any way.
- The product has been dropped or subjected to shock in excess of 100 G.
- The product has been exposed to water, any liquid, or condensing atmospheric humidity.
- The unit was powered from a source other than those which are specified in the instruction manual.
- The unit was operated in an area with ambient temperature outside of the operating temperature range, as stated in the product specifications and instruction manual.
- The serial number or other identifying marks are removed.
- Ownership of the product has changed. (This warranty is not transferable.)
- The warranty period has expired.

NEITHER THIS WARRANTY NOR ANY OTHER WARRANTY OR GUARANTY, EXPRESSED OR IMPLIED STATUTORY OR OTHERWISE, INCLUDING ANY IMPLIED WARRANTY OR CONDITION OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, SHALL EXTEND BEYOND THE WARRANTY PERIOD. NO RESPONSIBILITY IS ASSUMED FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES INCLUDING, WITHOUT LIMITATION, DAMAGES RESULTING FROM PRODUCT MALFUNCTION, INACCURACY, OR MATHEMATICAL INACCURACY OF THE PRODUCT SPECIFICATIONS. NOTHING IN THIS WARRANTY AFFECTS YOUR STATUTORY RIGHTS.

OTHER BENEFITS (NON-WARRANTY) THAT ARE ACCORDED TO YOU BY LASERGLOW:

10% Replacement/Upgrade Credit: At any time, for the lifetime of the product, you may return the product to us in any condition, functional or not, for a trade-in credit equal to 10% of the original purchase price or 10% of the current retail price, whichever is less. The new product which you select must be of equal or greater value than the trade-in product, based on the value used to calculate the 10% credit amount.

Out-of-Warranty Repairs: The cost of any out-of-warranty repair will be \$80/hr for labor, plus materials.

Rebuild/Complete Product Refurbishment: The cost of a complete rebuild or refurbishment of an out-of-warranty product will be no more than 60% of the current retail price.





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