

VS2 Machine Vision System

INSTALLATION AND DEPLOYMENT GUIDE

What's included:



1x Camera Controller

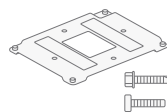


1x Camera



1x Controller Breakout Cable

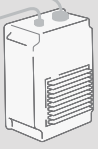
1x Camera Cable



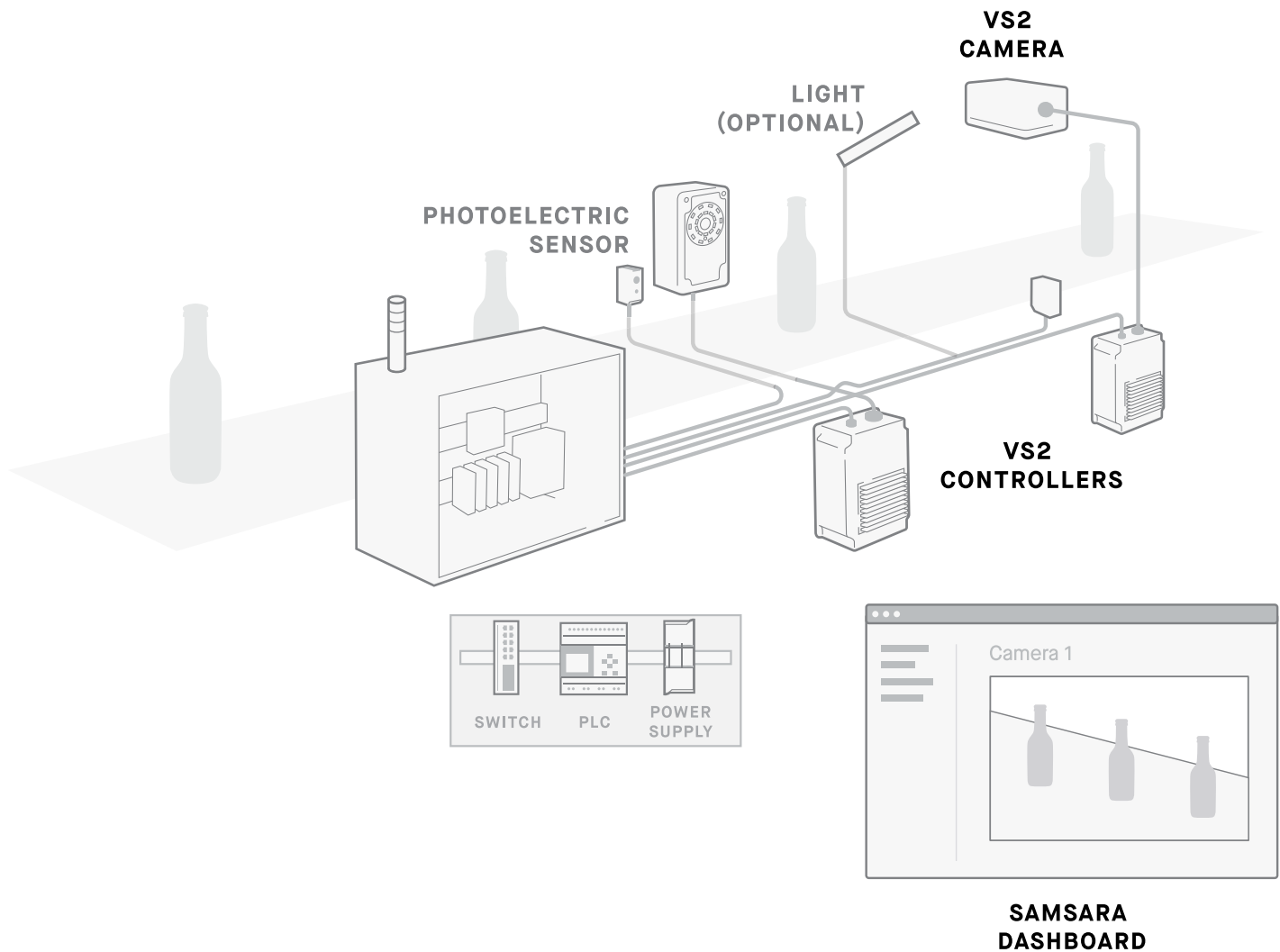
1x Controller Mounting Plate
4x Self-Tapping Screws
4x Flat-End Screws

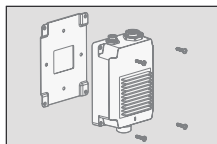


1x Camera Mount
1x 1/4-20 Flat-End Screw
4x M4 Flat-End Screws



The Samsara VS-series machine vision system is a complete solution for streamlining quality control across the factory floor. Once the system is installed, it can be programmed and updated remotely via the Samsara dashboard. This guide will walk you through the steps for deploying the system.



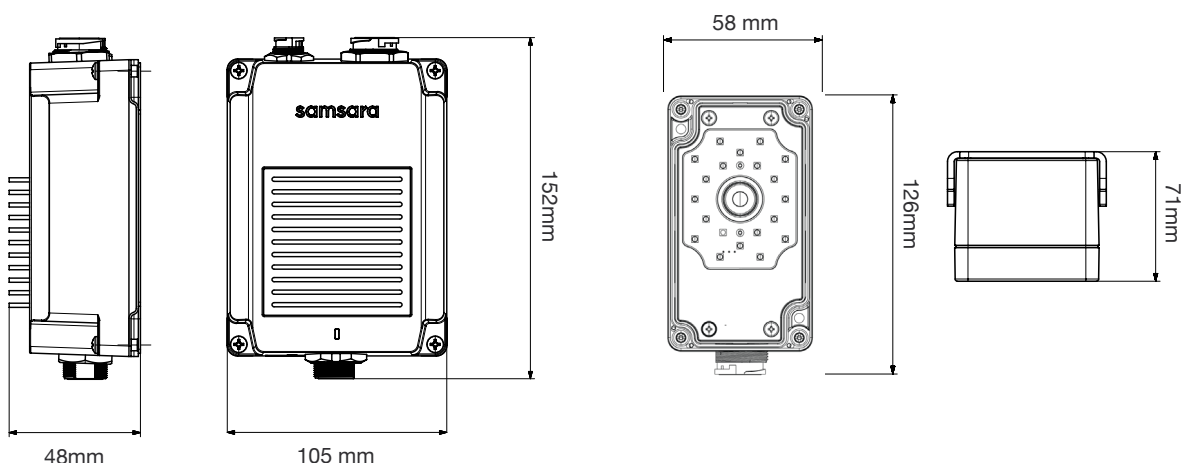


This section provides the information required for mounting the VS system including dimensions and important considerations for capturing clear images.

For additional guidance on mount brackets, external lighting, and special configurations, consult your Samsara representative.

VS2 Dimensions

Enclosure



Dimensions	Controller: 105 x 152 x 48mm (4.1 x 6.0 x 1.9 inches) Camera: 126 x 71 x 58mm (5.0 x 2.8 x 2.3 inches)
Materials	Controller: UV-stabilized polycarbonate, aluminum Mounting brackets: Powder-coated, corrosion-resistant stainless steel
Ingress protection	IP67, camera, controller, and cable connections are all washdown-rated
Industrial connectors	Power/IO, Camera: Bayonet-locking, IP67 Ethernet: RJ45 with included waterproof cap
Integrated illumination	White LEDs (5000K)

Imaging sensor

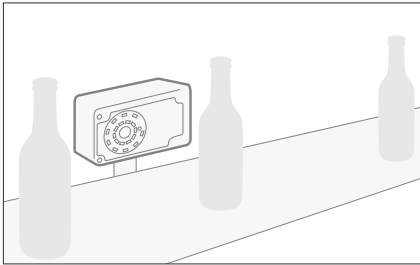
Working distance	152 to 280mm (6 to 11 inches)
Field of view	145 x 105mm at 152mm (5.7 x 4.1 inches at 6 inches) 243 x 185mm at 280mm (9.6 x 7.3 inches at 11 inches)

BEFORE GETTING STARTED**Mounting Considerations**

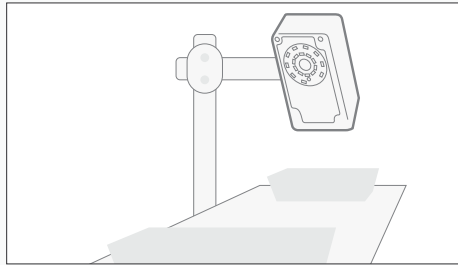
Before selecting a mounting bracket and mounting the camera, take the following considerations into account to ensure an easy installation process.

MOUNT POINT

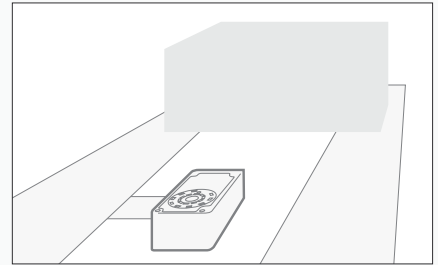
Identify where the camera should be positioned so it lines up with the product feature you plan to inspect. Some of the most common mount points are shown below.

**Beside the line**

Mounted beside a conveyor line for barcode inspection.

**Above the line**

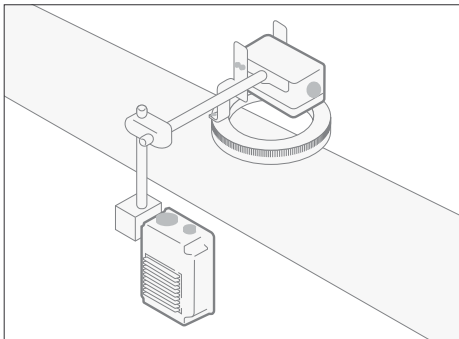
Mounted above a conveyor line for label matching.

**Under the line**

Mounted below a hugger belt conveyor for package inspection.

MOUNT STABILITY

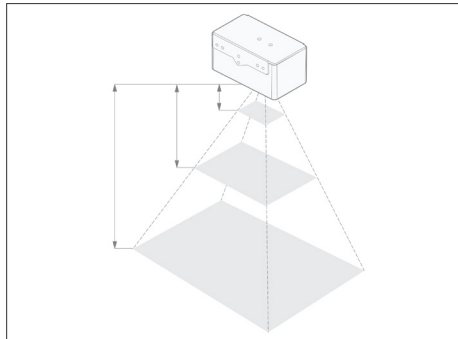
Ensure that the camera and mount are easy to clean without shifting position. Use shock mounts to minimize movement and maintain camera alignment where necessary.



A camera mounted on grooveless rods in a food manufacturing facility makes cleaning easy.

WORKING DISTANCE

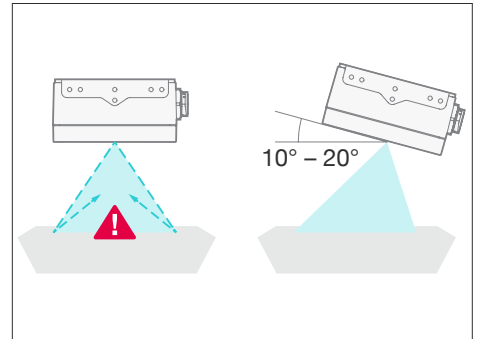
Certain camera lenses are optimized for certain working distances. Refer to the table on page 6 to understand the lens options available for a range of working distances and expected fields of view.



Different lens lengths will alter the available working distances and expected field of view dimensions.

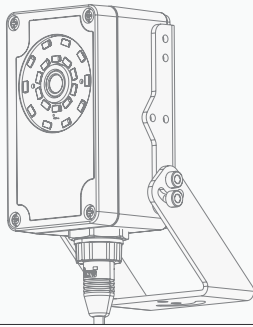
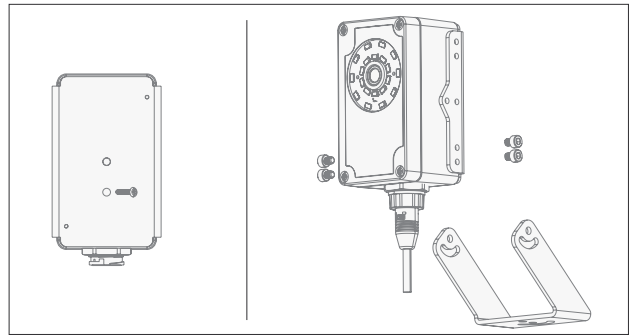
GLARE

In order to minimize glare when inspecting reflective products, tilt the camera at a 10° to 20° angle. Samsara may also recommend external lighting to reduce glare in specific applications.

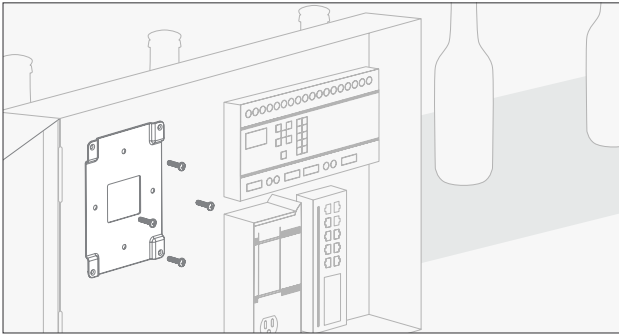


Tilt the camera to minimize glare. See Appendix 2 for details on external lighting.

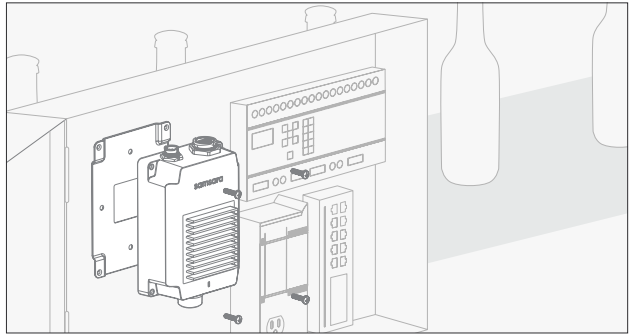
Mounting Steps

**1**

Once you have identified a mount location and installed your mount, mount the camera at the correct angle and working distance using the 1/4 x 20 mounting screw or the included swivel mount and M4 screws.

2

Using the self-tapping screws, install the controller mounting plate in your electrical enclosure. If you plan to connect the system via Wi-Fi, the plate and controller should be mounted outside of the enclosure near the inspection point.

3

Align the controller with the mounting bracket and attach using the flat head screws.

Working Distance and Lenses

Samsara lenses work across all working distances with our autofocus feature. However, to ensure your area of interest is appropriately focused, use the guidance below to determine your working distance based on field of view.

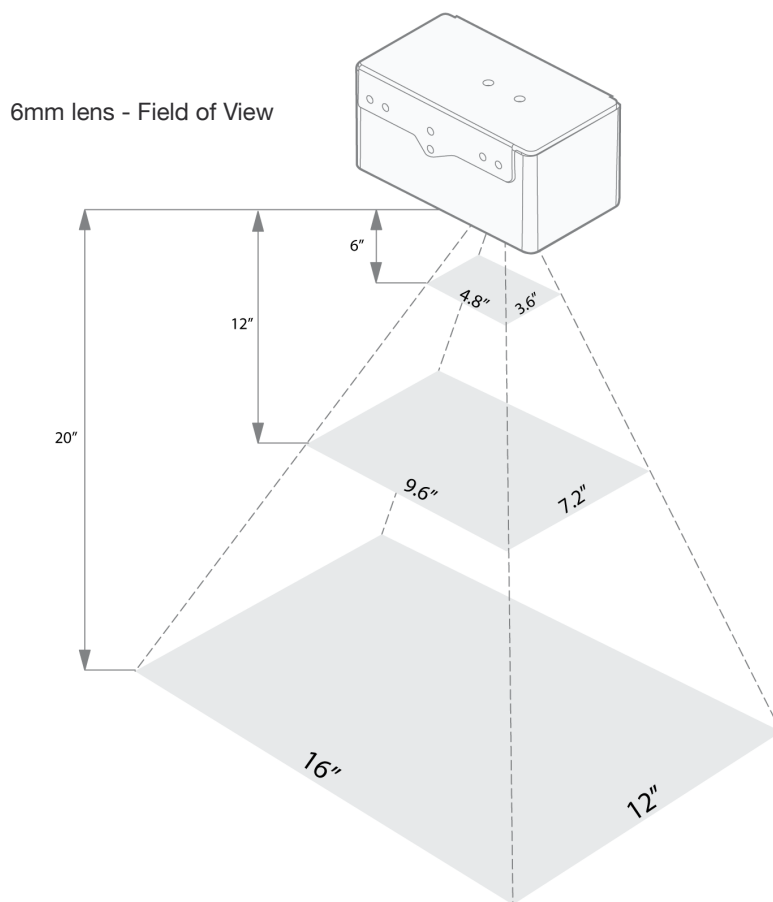


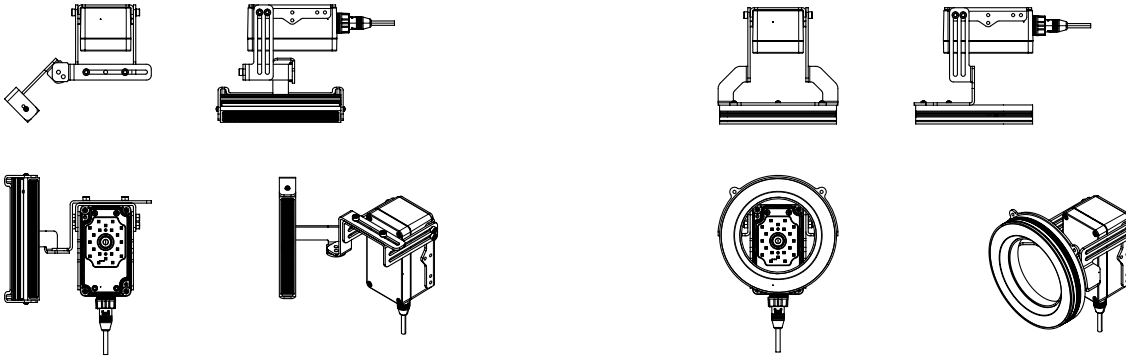
Table 1: Expected field of view dimensions based on lens length and working distance.

		Working Distance					
		4 in	6 in	12in	20 in	36 in	50 in
Lens	4.2mm	4.57 in x 3.43 in	6.86 in x 5.14 in	13.71 in x 10.29 in			
	6mm		4.80 in x 3.60 in	9.60 in x 7.20 in	16 in x 12 in		
	8mm		3.60 in x 2.70 in	7.20 in x 5.40 in	12 in x 9 in		
	12mm			4.80 in x 3.60 in	8 in x 6 in	14.40 in x 10.80 in	
	16mm			3.60 in x 2.70 in	6 in x 4.50 in		15.00 in x 11.25 in

Note: If you have specific questions about lens options and field of view, please reach out to Samsara support.

External Lighting

While the integrated VS2 light may work for some use cases, it may be recommended to use an external lighting source to improve the contrast between object details for specific machine vision applications.

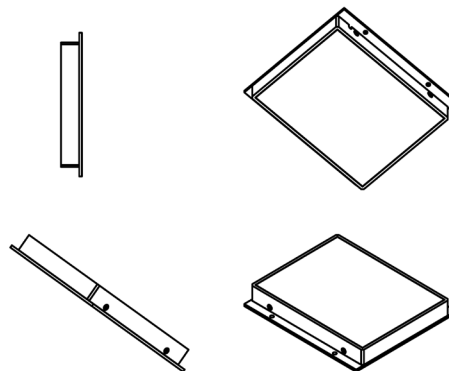
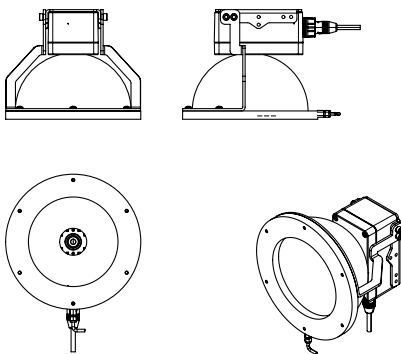


BAR LIGHT

Bar lights are strips of lights that can be mounted in a variety of configurations to provide light from different angles. As a result, bar lights are a flexible lighting solution that can be used in a variety of use cases from providing contrast to read objects on matte surfaces to highlighting defects or scratches.

RING LIGHT

Ring lights provide a concentrated source of light that can be used to remove shadows from an area of interest. It can cause glare so it will not work well for reflective surfaces.



DOMELIGHT

Dome lights provides uniform lighting on the product to help capture perform inspections on shiny or bumpy surfaces. To work effectively, the dome light should be mounted close to the object being inspected.

AREALIGHT

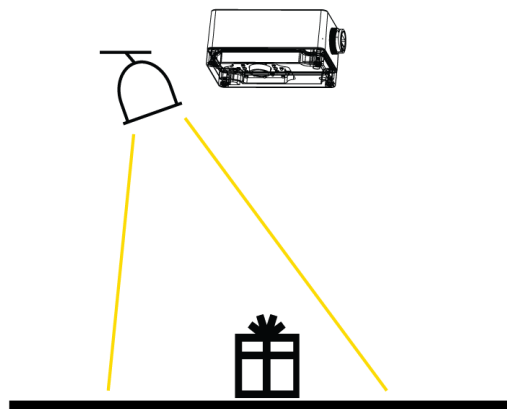
Area lights provide diffuse lighting from a large rectangular source. These are most effective when used in a backlighting configuration (see next section).

Light Orientation

ANGLED / BRIGHT FIELD LIGHTING

Type of Lights: Bar, Ring, Dome

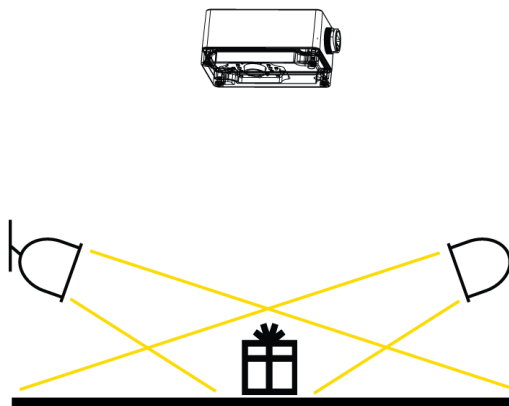
Application: This is best used to generating contrast for object details while removing a “hot spot” from direct lighting.



DARK FIELD LIGHTING

Type of Lights: Bar, Ring

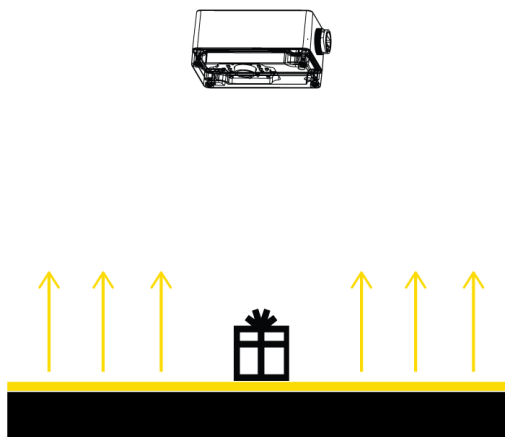
Application: The shallow angle of light allows for surface features, such as blemishes, scratches, or imprints to jump out against the background.



BACKLIGHTING

Type of Lights: Area

Application: This type of lighting accentuates outlines and gaps of products. It can also highlight blemishes on clear surfaces.



Network Configuration

CONNECTION PROTOCOLS

Ethernet - 10/100 Mbps (10/100 Base-T)

Wifi - Wifi 802.11 b/g/n

FIREWALL CONFIGURATION

No inbound port forwarding rules are required

VS2 requires DNS and NTP for name resolution and accurate time

Outbound communication to the Samsara Cloud is via TLS over TCP port 443

IP CONFIGURATION

The camera is configured to acquire an IP address via DHCP, but can be configured with a static IP address on its ethernet port. Wi-Fi connectivity requires DHCP.

SETTING UP WIFI

To set up Wifi on the device, the controller must be first connected via ethernet cable. Once it is connected, you have to log into the Samsara cloud and navigate to the general settings page. In the connection subsection, you will see the ability to add or edit existing wifi connections:

When adding a network you will be expected to provide the Wifi encryption type and other relevant information:

Wi-Fi Networks ⓘ

Add Network

samsara - WPA [Edit](#) [Remove](#)

Add Wi-Fi Configuration

Network Name

Network

Encryption Type

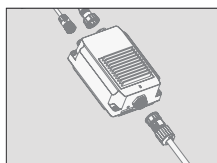
Select an encryption type

- Open
- WPA (PSK) - Encrypted
- WPA Enterprise - Encrypted

Bandwidth Requirements

For best performance of the cloud UI, we recommend a minimum bandwidth of 5 mbps for the connection used by the VS2. This will ensure a stable connection between the Samsara cloud and the local VS2 unit.

The image upload rate is limited to 262 kbps per VS2, which translates into 1 pass and 1 reject uploaded every second. If this upload rate is too much for your network, you can configure this within the settings.

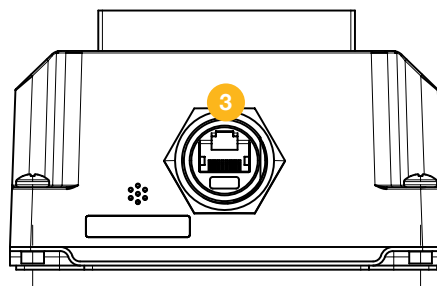
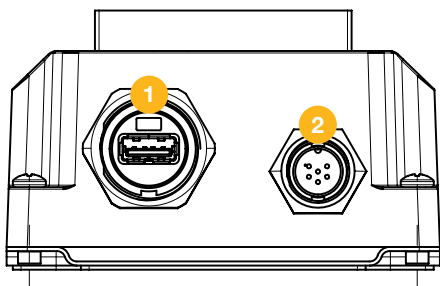


This section describes the connection of the vision system to standard components. The VS2 features ethernet and Wi-Fi for internet connectivity and supports trigger inputs and outputs from NPN and PNP devices and lines.

For additional guidance on integrating with both rejection and local control systems consult your Samsara representative.

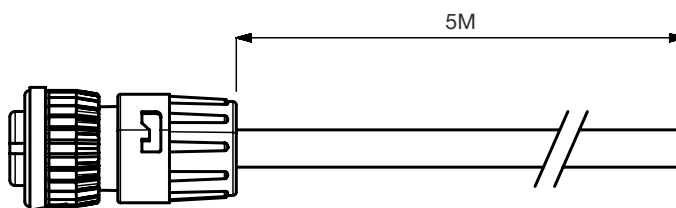
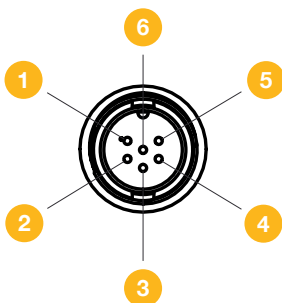
Connectors and Indicators

Controller connectors



Connector	Name	Function
1	Camera	Connects the controller to the camera.
2	Power/IO	Connects the breakout cable which provides power as well as connections to the input trigger and output.
3	Ethernet	Connects the controller to the network.

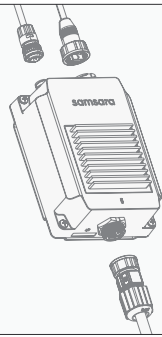
Breakout cable pin-out



Pin	Signal Name	Wire Color	Voltage Specification
1	Power	Red	12V
2	Ground	Black	—
3	Input Trigger	Green	10 – 30V
4	Input Common	White	10 – 30V
5	Output	Blue	10 – 30V
6	Output Common	Gray	10 – 30V

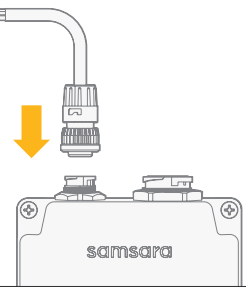
Wiring Steps

BASIC SETUP

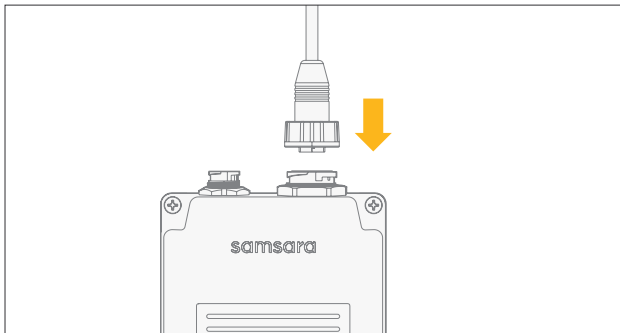
**1**

Red (10-17VDC)

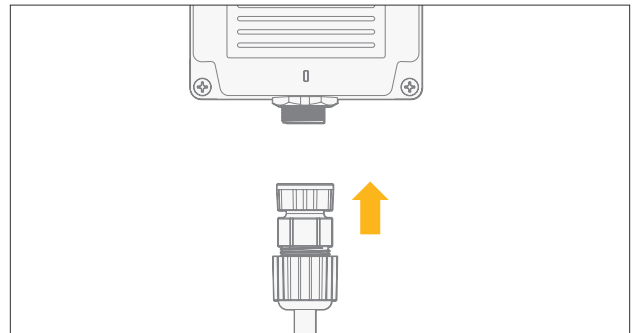
Black (CMN)



Connect breakout cable to controller and wire the red (POS+) and black (NEG-) wires to the correct terminals on the unplugged power supply.

2

Connect the controller to the camera using the camera cable.

3

Connect the controller to an active internet connection via ethernet.

Note: Contact Samsara if you would like to receive units pre-configured with Wi-Fi credentials.

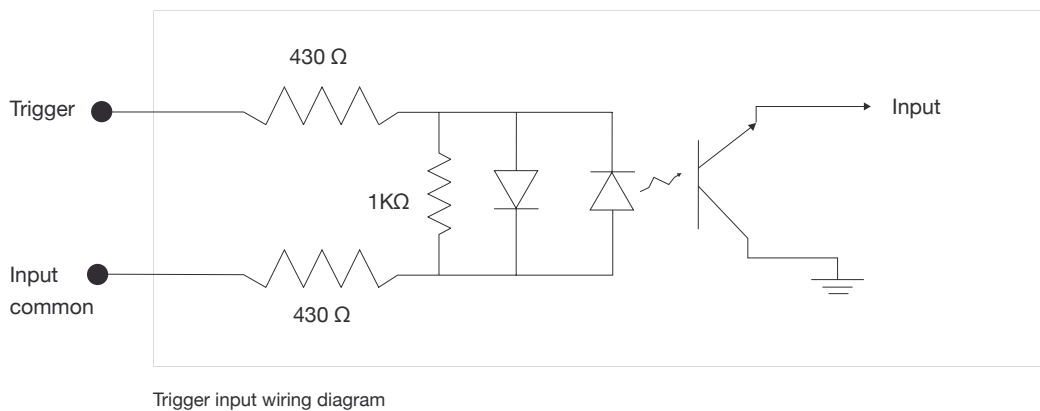
CONNECTING A TRIGGER INPUT

Triggering from an NPN device

Connect the Input common wire (white) to +10-30VDC and the Trigger wire (green) to the output of the trigger.

Triggering from a PNP device

Connect the Input common wire (white) to +0-3VDC and the Trigger wire (green) to the output of the trigger.



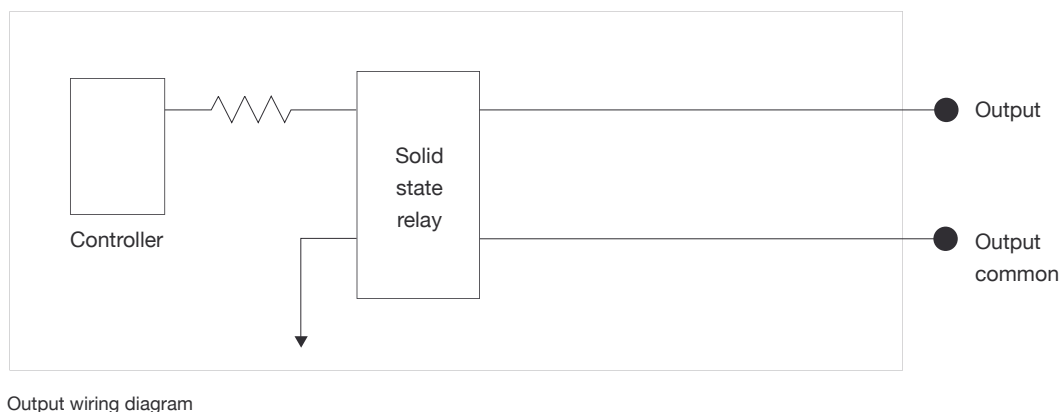
CONNECTING AN OUTPUT

Connect for an NPN line

Connect the Output common wire (gray) to the negative supply voltage and connect the Output wire (blue) to the desired device.

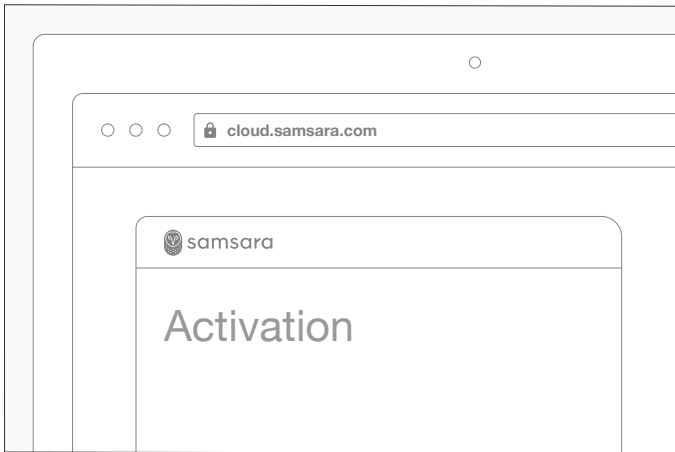
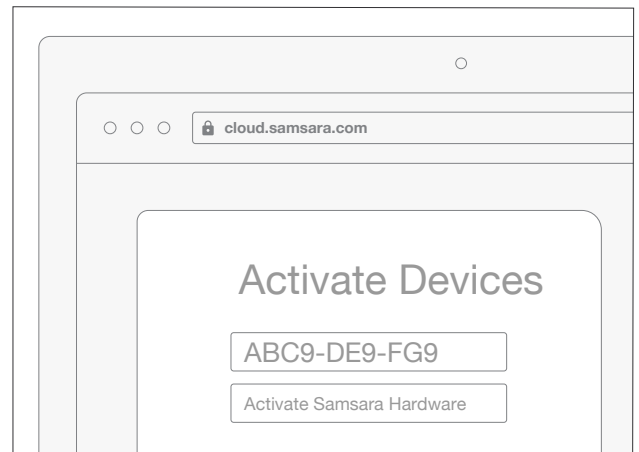
Connect for a PNP line

Connect Output Common wire (gray) to the positive supply voltage and connect the Output wire (blue) to the desired device.



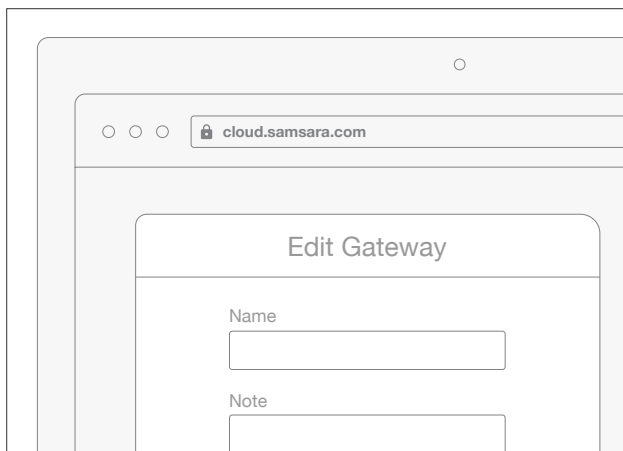


This section walks you through the steps you should take to set up your hardware in the Samsara dashboard.

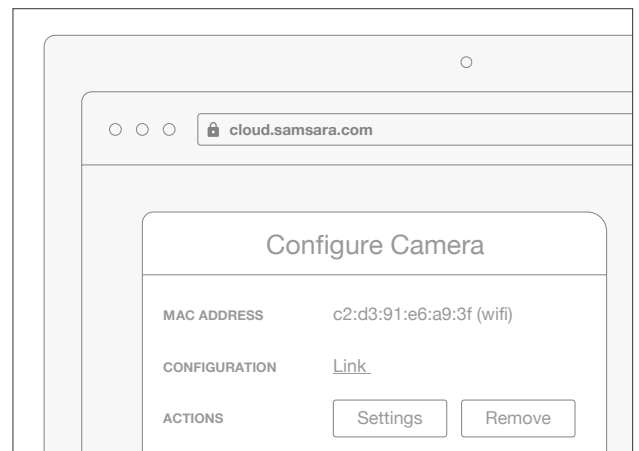
**1**

Go to cloud.samsara.com, create an account, and follow the on-screen steps to activate your hardware.

You can find your serial number on the back of the controller or its box.

2

Your newly activated controller will populate in the dashboard. Click Settings to rename the controller.

3

Your camera is now ready to be configured with inspection programs. Click Link to start the configuration.

Programs Overview

In order to use the VS2 to begin inspecting products, you will need to first build specific programs for the products or SKUs that will be evaluated. Programs contain the business logic for what the camera should be evaluating when running. As an example, you can build a specific program to verify that the labels on Product XYZ are being placed correctly. Programs are composed of four components: camera settings, inspection steps, trigger configuration, and output configuration. Once you have everything configured, you can begin running the programs to perform your inspections in real time.

Programs are configured on a per camera basis, so the programs that should be built depend on the type of evaluation being done and where it is being mounted on the line. If you have multiple cameras performing the exact same inspections, we have a tool called Cloud Sync that can be used to copy programs across cameras. This is discussed in more detail in the Cloud Sync section.

Depending on your use case, you can set up programs to match individual SKUs or multiple SKUs depending on the type of inspection being performed and how changeovers are done.

Camera Settings

The first thing to set up when building a program are the camera settings. These settings are important to ensure the images you capture have sufficient contrast and clarity. The settings are listed below:

Camera

Inspection

Trigger

Exposure (ms)

0ms

100ms

1

Gain ⓘ

-60

0

60

0

Rotation

0°

90°

180°

270°

360°

0

Focus

Auto Focus

Calibrate

Near

Far

310

Internal Light

Off

Brightest

0

☐ Equalize light in image
 ☐ Sharpen image
 ☐ Focus overlay

Disable focus overlay after setting up camera

Exposure

This is the shutter speed of the camera in milliseconds. In simpler terms, this controls the brightness of the image. A higher exposure time will result in a brighter image with more light coming through, but the risk is that the image may be blurry due to movement or too bright. For best practice, keep the exposure as low as possible given the lighting conditions.

Gain

Gain can programmatically adjust the brightness of the image if you cannot get an image with sufficient contrast. Any adjustments to gain can decrease image quality so avoid adjusting the gain if possible.

Rotation

Rotation helps orient the captured image for inspection. The rotation is measured clockwise, so setting this to 90 degrees will adjust the image 90 degrees clockwise.

Focus

The focus setting will adjust the focus of the camera to the working distance between the camera and the object of interest. A higher focus setting will focus the camera at a further distance. For the simplest workflow to focus the camera, use the “Auto Focus” feature. This will automatically adjust the focus to the object in frame. For best practice, make sure there is sufficient contrast within the camera view. Please allow a minute for the auto focus procedure to complete.

Equalize Light

This will programmatically improve the contrast of your image.

Sharpen Image

This will programmatically sharpen your image to increase clarity. This is particularly helpful where you need to focus in on smaller text or edges.

Focus Overlay

This helps to determine if the image is appropriately focused. Share, in-focus features are automatically highlighted in green.

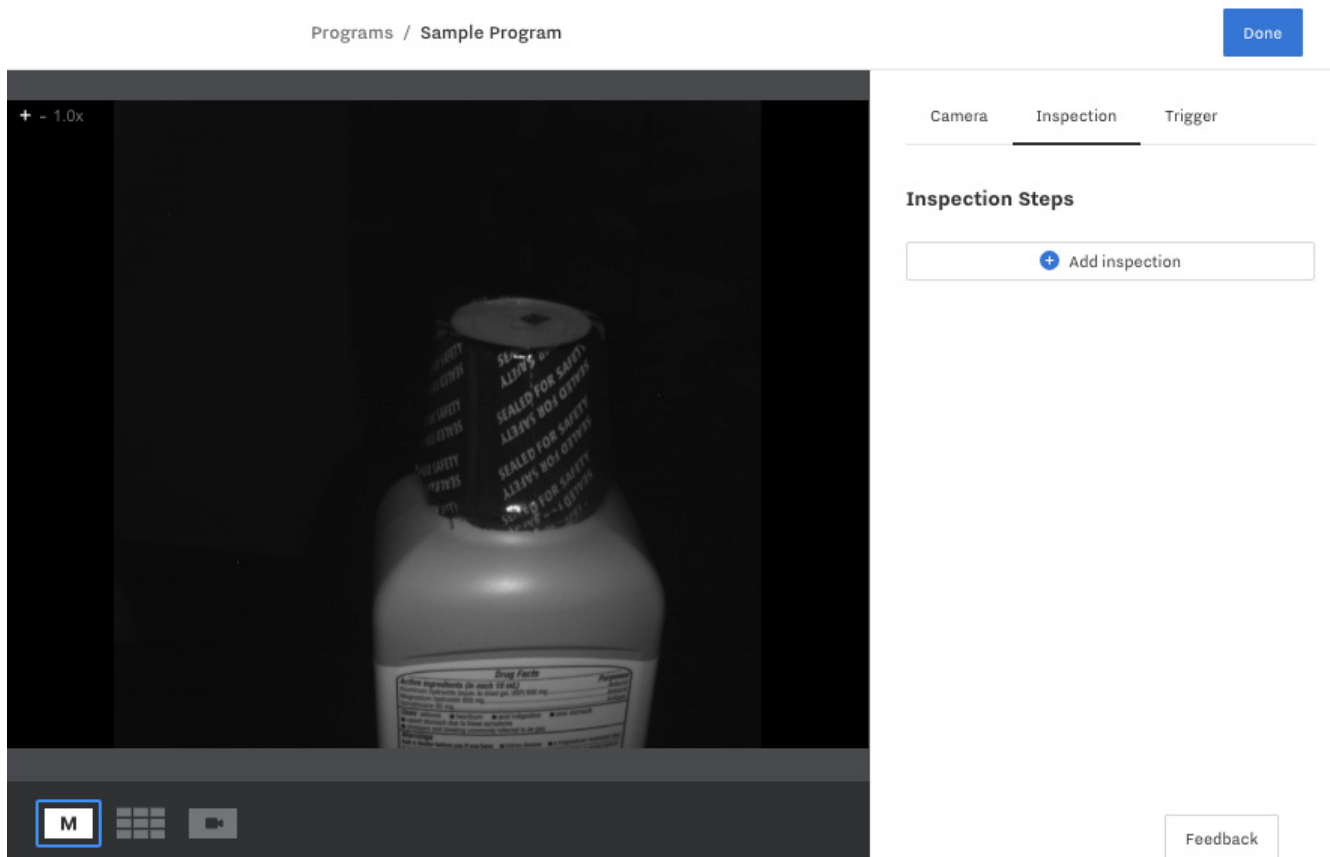
Setting a Master Image

Once you've set up your camera settings to capture clear images, you need to take a **master image**. This will be the reference photo that all your inspection steps will be built with. For best practice, ensure that the image has all objects of interest in focus and with clear contrast.

To set the master image, navigate to the "Inspection" tab on the right side of the screen. If you have no master image, you will be prompted to set your master image. Once you have your object in frame, click the "Set as master" button on the bottom of the screen (as seen below). This will capture the image in frame and set it as the master image.



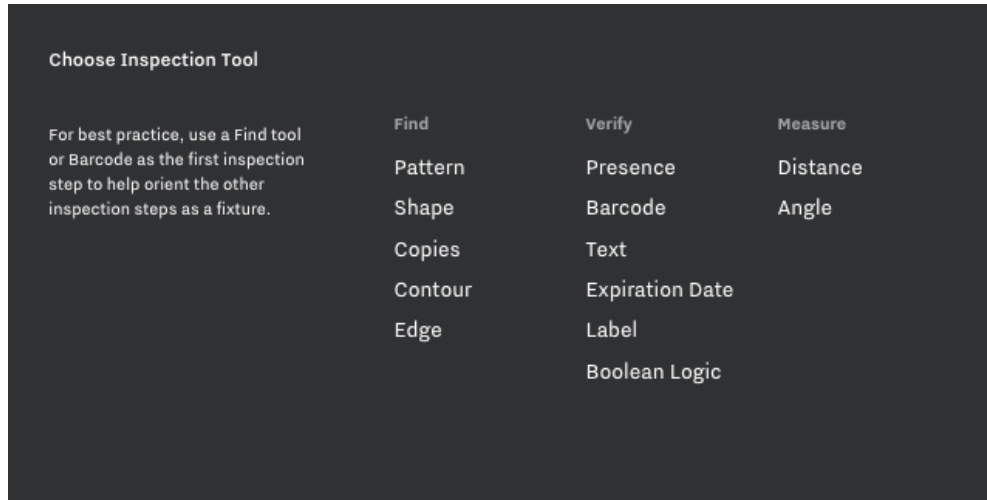
Once your master image is set, you'll be taken to a new screen where you'll be prompted to start building your inspection steps.



To reset your master image at any time, you can click the camera icon at the bottom.

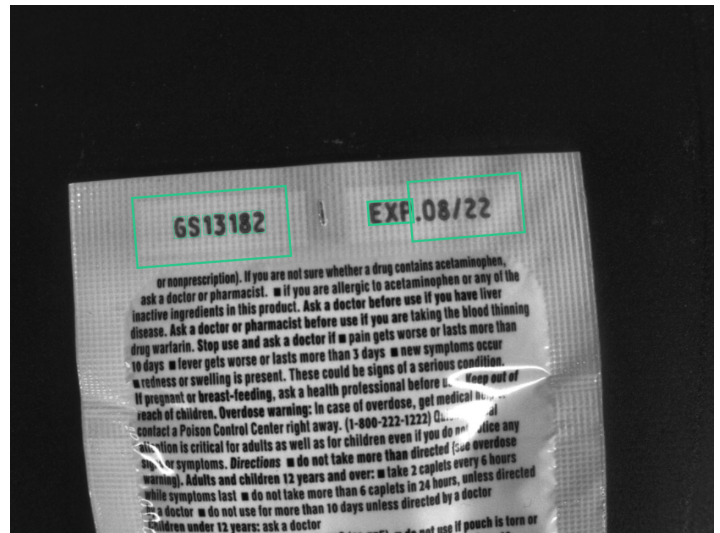
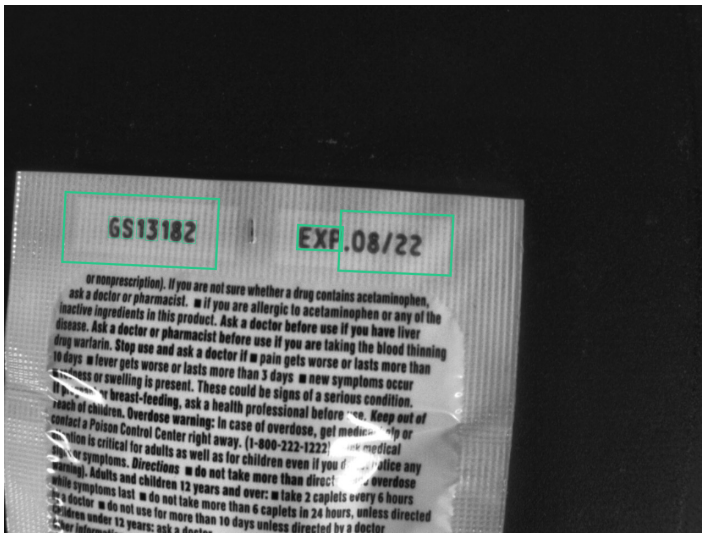
Inspection Tools

Once you have set your master image, you can begin adding inspection tools to your program. To get started, all you will need to do is click on the “Add inspection” button and you’ll see a new pop-up that will list all the inspection tools available:



Using a Fixture

A fixture is a previously defined inspection type that can be leveraged by other inspection steps to help position the search area relative to the fixture. A common reason to use a fixture is if the items will be moving down the production line in unpredictable positions and rotations. For example, in our pill pack inspection for lot code and expiration date, we are using the “EXP” text as a fixture to help position our inspection search areas. Without the fixture, our search area would be much larger and inspection performance would decrease.



Inspection tools that are eligible to be fixtures are: Pattern, Shape, Copies, Contour, Edge, Barcode. For tools that can potentially return more than one object, we will use the first object found as the fixture. When building out inspection steps, one of the first options will be to assign the inspection to a fixture as seen here.

To easily see which steps are using a fixture, in the master inspection list you will see a box with a number on the right side of the card. In the example here, both Expiration Date and Lot Code are using our first step as a fixture.

Camera

Inspection

Trigger

A

Text

Sample

Fixture

None ^

Image Filters

None

Barcode

1

EXP

2

A

Expiration Date

[1]

3

A

Lot Code

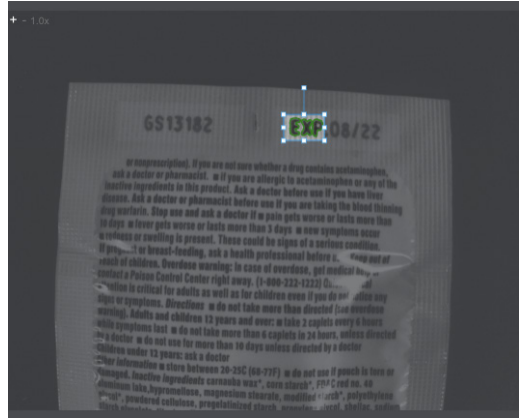
[1]

Tool Summary



Pattern

This tool will search the entire image capture for a specific pattern that the user finds in the master image. A pattern is a symbol or unique pattern that exists in the image. The pattern must be a closed object, meaning that we should be able to see the entire object in frame. If it is only a partial piece of the object in frame, you should use the Contour inspection step instead.



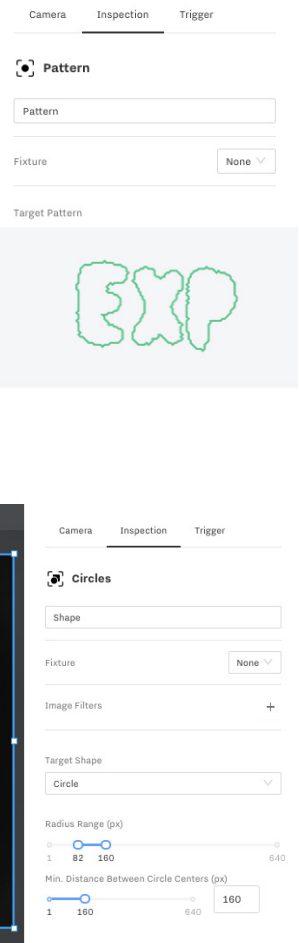
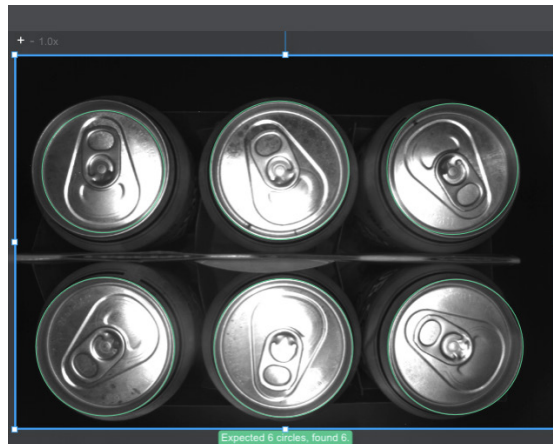
Shapes

The Shapes tool can be used to find and count the number of blobs, circles or rectangles in the search area defined by the bounding box. Each option has specific parameters that are described below:

Blob (Binary Large Object) - Blobs are objects of any shape or size. This option requires the use of a threshold filter and will search for any black objects against a black background. You will have the ability to filter blobs based on size, circularity, convexity, or elongation ratio.

Circle - This option will find only circles within the bounding box. You will have the ability to filter based on the size of the radius for circles. This option will filter out shapes that are not close to exact circles. For round objects that are not circles, use the blob option.

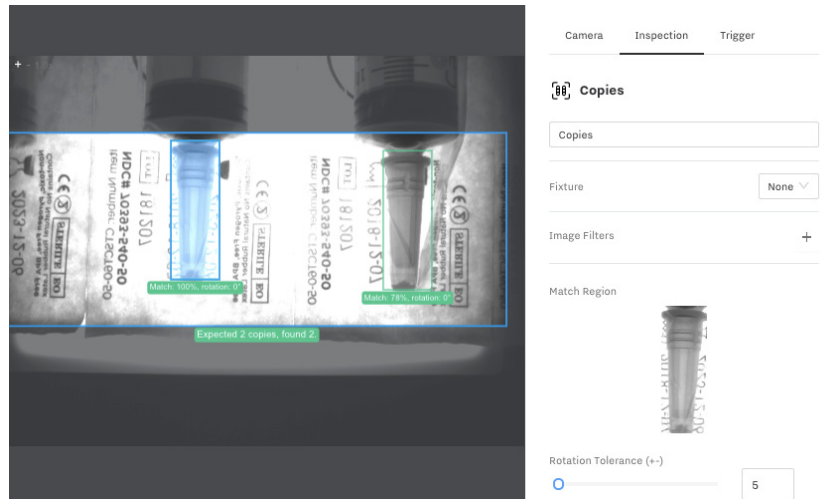
Rectangle - This option will find rectangles with right angles at each corner. You will have the ability to filter based on rectangle area, aspect ratio, or corner angle tolerance.



Copies

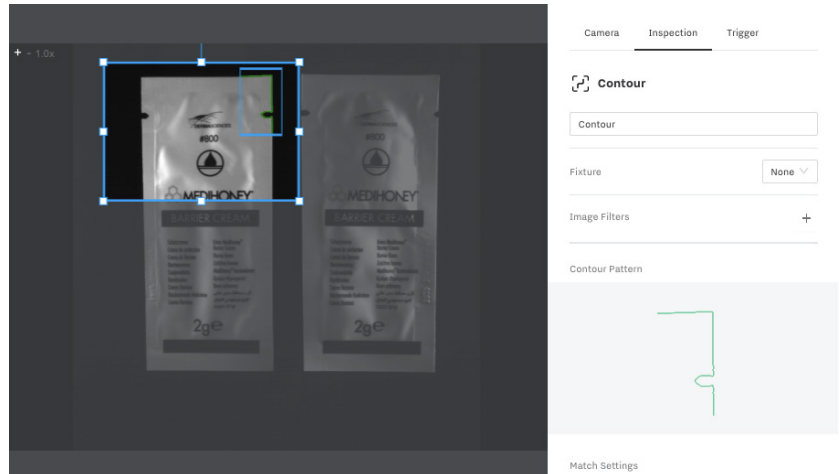
The Copy inspection tool will find and count the number of copies of a particular object in your master image. To use this tool, you will need to configure two bounding boxes: the search area bounding box and the item to search for. Once you have identified your object you want to find copies of, you can adjust the match tolerance and angle of rotation to find all the copies within the search box.

To improve performance speed of this step, reduce the angle of rotation tolerance.



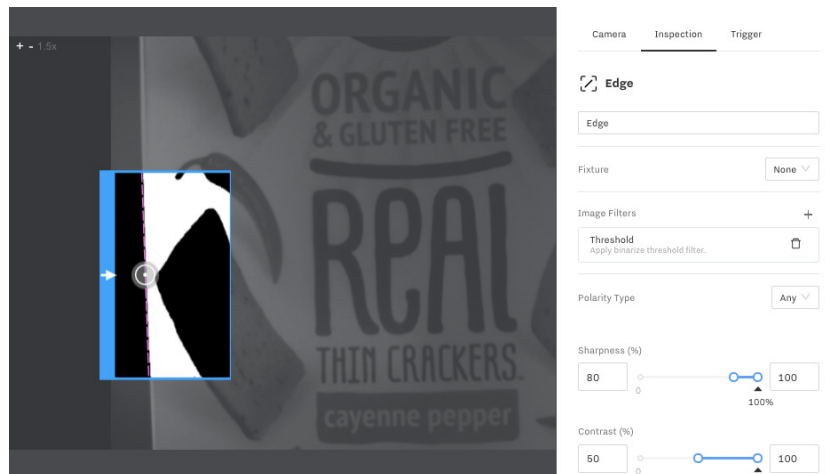
Contour

The Contour tool will allow you to search for edge contours where there is sufficient contrast between the object of interest and the background. Unlike the Pattern tool, this tool allows you to search for partial objects such as the corner of an object.



Edge

The Edge tool will search for edge in the direction of the arrow shown on the bounding box. A threshold filter will automatically be added to help increase the contrast between light and dark areas to make edges easier to identify. You can adjust the polarity, sharpness, and contrast to ensure the edge of interest is found.

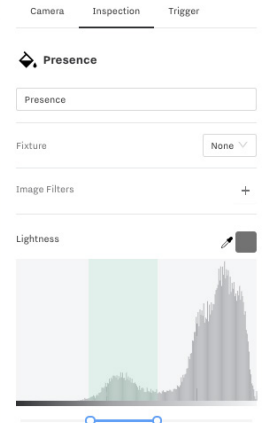




Presence

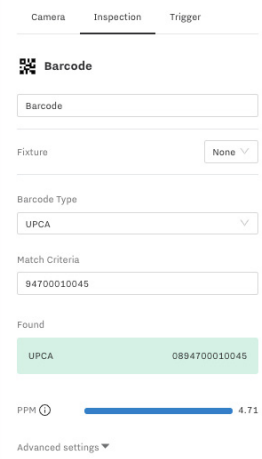
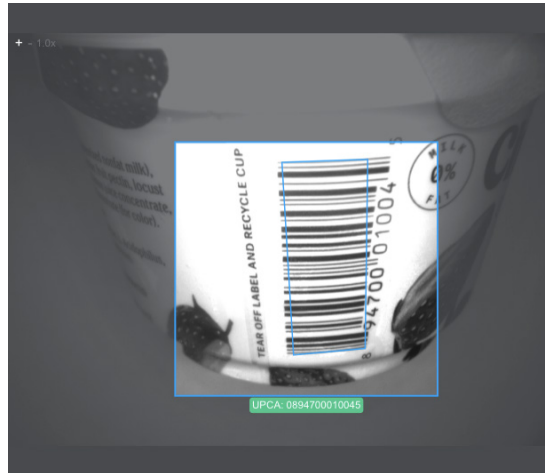
The presence tool can be used to determine what percentage of a specific grayscale color range is present (or absent) in the search bounding box. After you select your search area, a histogram of the pixel color distribution will appear on the right site. Adjust the histogram slider to select the range of pixel colors you want to test for the presence (or absence) of and it will become highlighted green on your master image. The threshold set for the inspection will be used to determine a pass or fail.

In the VS2 Color units, additional options are available to build inspections based on the presence of RGB (Red, Blue, Green) or HSV (Hue, Saturation, Value) values within the pixels.



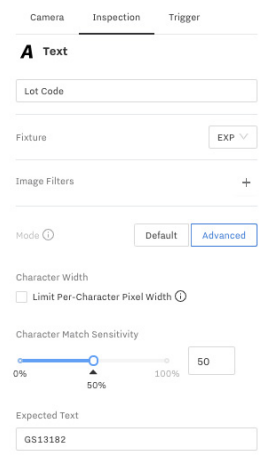
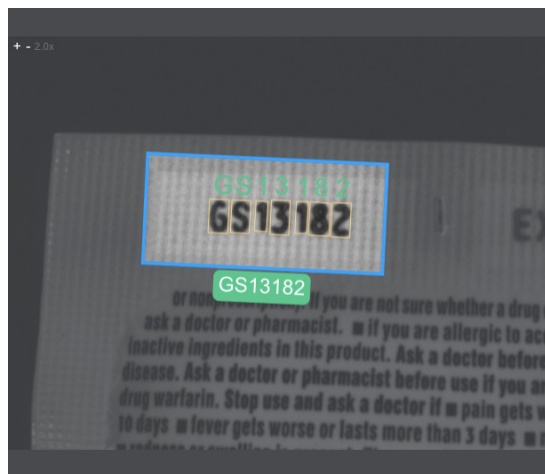
Barcode

The Barcode inspection tool finds and reads a 1D or 2D barcode within the search bounding box. You can then set up a match criteria for what the expected barcode should be. The Samsara machine vision system supports a long list of barcode types that are listed in the datasheet.



Text

The text tool leverages Samsara's optical character recognition (OCR) algorithms to reach text from within your image and compares it to an expected string that can be in the form of a string regular expression. There are two modes of operation: default and advanced. The default mode works well for most large text with well defined contrast. The advanced mode should be used for smaller text or harder to read fonts. Within advanced, you will have many options to help segment the characters and the ability to train our character recognition algorithms.





Expiration Date

The Expiration Date tool works leverages our text tool capabilities but allows users to set the expected text to a date some number of days in the future. Multiple date formats are supported, please work with Samsara Support if the date format used is not available.



Camera Inspection Trigger

Mode

Timezone
America/Los_Angeles (UTC-7)

Date Format

Days from Inspection
- +
11/11/19

Found

Advanced settings ▼



Label

The Label tool uses a master image or uploaded image to compare against the images that are captured during a program run. The comparison criteria that our inspection tool uses is a concept called features. Features are unique attributes that our image processing algorithm identifies in an image.

During a program run, the label inspection tool will identify as many features in the production image that are shared with the master image. In order to pass the inspection, the number of features found in the production image must exceed a user defined threshold.



Camera Inspection Trigger

Target Image
Current master image
1000 features found

Upload

Min. Feature Count

Advanced settings ▼



Boolean Logic

Boolean Logic allows users to combine the inspection results from previous steps with Boolean operations. The supported boolean operations are: AND, OR, XOR, NAND, NOR, XNOR. For more information about boolean operations, please refer to the following Wikipedia article: https://en.wikipedia.org/wiki/Logic_gate.

Camera Inspection Trigger

Combine the results of previous inspection steps into a new result using logical operators.

Boolean Logic

☒ AND ☐ OR ☐ XOR ☐ NAND ☐ NOR ☐ XNOR

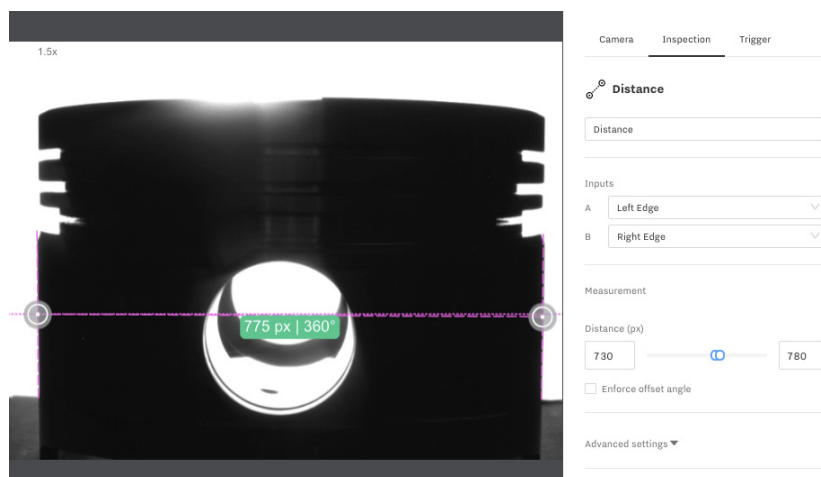
☒ Barcode
☒ Expiration Date
☒ Text Match
☒ Color Match

A passing result from all of the selected steps will result in a pass.

☒ Use this step as final result ⓘ

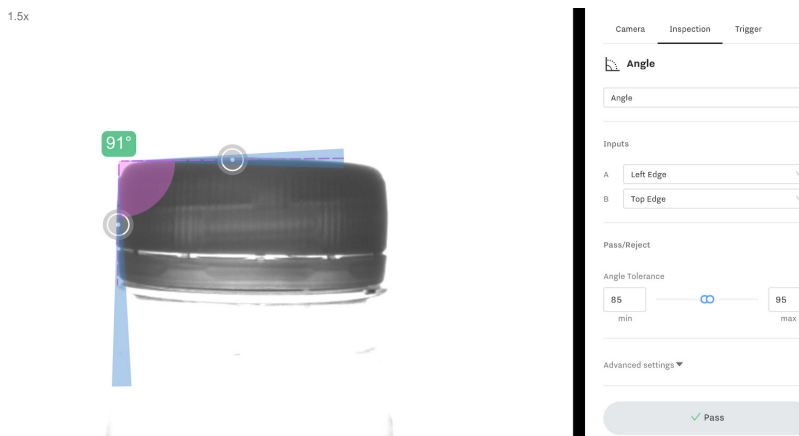
Distance

The Distance tool takes in two inputs from previous inspection steps and measures the distance between them. Only results from the steps in the “find” column can be used as parameters in the distance inspection: Pattern, Shape, Copies, Contour, and Edge. The distance is measured in pixels on the image, but can be translated into a distance measurement. Thresholds can be set for minimum and maximum distances, as well as minimum and maximum angles of measurement.



Angle

The angle returns the angle between two edges found in previous steps. A minimum and maximum angle thresholds can be set to determine whether the inspection passes.



Preprocessing filters

In addition to the inspection tools, users can also configure pre-processing filters on the image to improve the result of the inspections. The different filters are described below:

Open (separate)

The Open filter can be used to separate white objects on dark backgrounds from each other, useful in cases where multiple segments are being identified as a single entity. It is the opposite of the Close filter, and is equivalent to an Erode followed by a Dilate.

Close (connect)

The Close filter can be used to connect white objects on dark backgrounds to each other. A common use case is to apply this filter to dot-matrix-printed text such that they become connected as a single character for easier segmentation. It is the opposite of the Open filter, and is equivalent to a Dilate followed by an Erode.

Erode (shrink)

The Erode filter will shrink, or decrease, the size of a white object on a dark background. It has similar applications to the Open filter, except the Open filter will apply a dilation as well, returning the object to the original size. This is the opposite of the Dilate filter.

Dilate (grow)

The Dilate filter will grow, or increase, the size of a white object on a dark background. It has similar applications to the Close filter, except the Close filter will apply an erosion as well, returning the object to the original size. This is the opposite of the Erode filter.

Invert

The Invert filter will invert the polarity of each pixel within the image. In other words, it will turn dark pixels into light pixels and vice versa.

Color

The Color filter will allow you to highlight pixels within a specific range in your image by converting pixels within the color range selected into black. If you select the “binarize” option, it will also convert all pixels outside of your specific range into white pixels.

Threshold

The Threshold filter behaviors similar to the color filter but instead of selecting a range, you just need to set a threshold level. All pixels darker than the threshold will be converted into black pixels and pixels below the threshold will be converted to white pixels. By default, the “Automatic” mode of this threshold will be set but setting the algorithm to “Manual” will allow you to set the threshold for more configurability.

Blur

The Blur filter removes high frequency content from the image in order to reduce noise within the image. In other words, it introduces some blurriness to the image so that it smoothes out some of the features of interest. Four blur algorithms are offered: Box, Gaussian, Median, and Bilateral.

Edge

The Edge filter highlights edges in the image using a Sobel Filter. This allows for edges of objects in the frame to be more clear for inspection tools.

Triggering Options

The last tab on the right side of the program screen is the “Trigger” configuration. In this tab, you can set up the trigger type for program. Three options are available:

- **Periodic:** This option will cause the camera to capture an image in a timed periodic fashion as defined by the user specific time in milliseconds.
- **External:** This option will cause the camera to trigger only when an externally wired device (such as a photo-electric breakbeam) outputs a trigger into the VS2 device.
- **Off:** This option will cause the camera to only trigger based on manual input from the user.

Camera Inspection **Trigger**

Trigger Type

External

Periodic

External

Off

Advanced settings ▼

Setting up the Output

Once you have finished configuring your program, the next step is connecting your VS2 to your external systems such as rejectors or tower lights. To do this, you need to define the desired behavior for when to send a signal through the VS2 output wire. This behavior is defined in the “Output” section on the bottom left of the program screen. The output behavior is unique to each program, so you can set your tolerance for when to trigger an outbound pulse differently for different programs.

To test the pulse with your external system, click the “Test Pulse” button and a pulse will be sent through the VS2 output wire.

A second output option available is to configure a webhook to receive real-time inspection results via an outbound API. This option requires you to provide a URL endpoint for the VS2 devices to programmatically send inspection step results via JSON. Again, you can define the behavior for when to send results outbound via the webhook. The webhook and GPIO can be used at the same time.

Output

GPIO ▾

Conditions



3

consecutive rejects



5

consecutive no-reads



1

consecutive passes

Pulse Settings

Delay (ms) ⓘ

1000

Pulse Duration (ms)

3

Test Pulse

Output

Webhook ▾

Conditions



1

consecutive rejects



1

consecutive no-reads



1

consecutive passes

Webhook Settings

Delay (ms) ⓘ

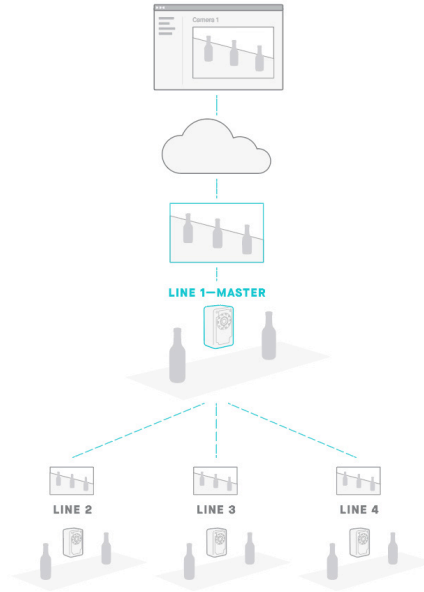
1000

URL

For more information about the APIs, please refer to the VS2 API guide.

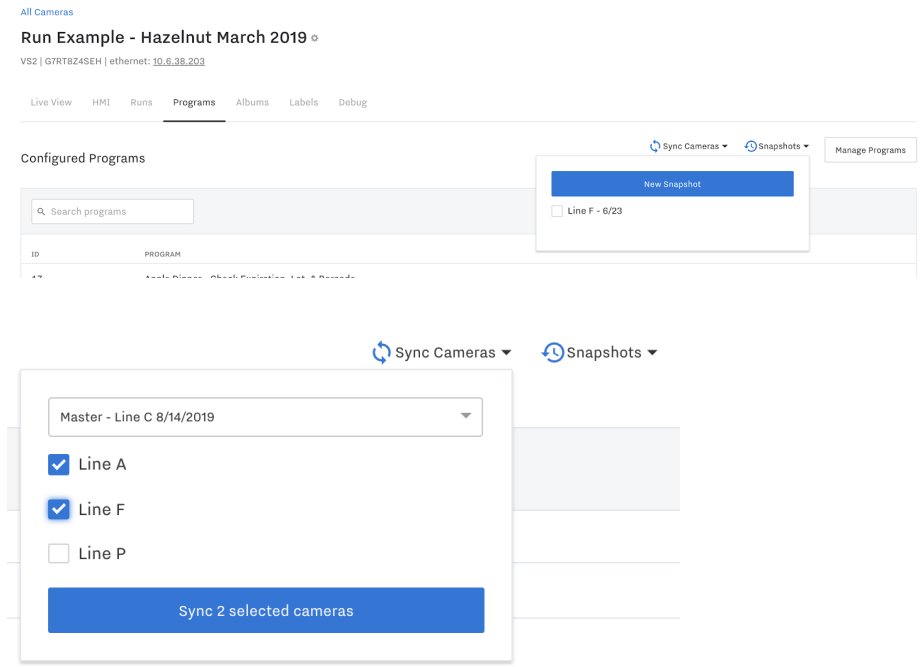
Cloud Sync

Once you've built programs on one of your VS2 units, you can easily push them out to units across multiple production lines using the Cloud Sync feature. Cloud Sync works by taking all the programs on a camera and storing the configurations (including programs) to the Samsara Cloud. Once it is in the cloud, you can push out the configuration to any number of devices within the same organization. This allows you to easily scale the programs from a master line onto the rest of the lines to simplify and speed up the process of getting other lines operational.



Cloud Sync works in two steps:

1. Once you have built all the necessary programs on the master VS2, you must take a snapshot of it from the program list view. By doing so, we will automatically take a snapshot of all the programs on the devices and load it to the Samsara Cloud. This backup includes all the program inspection steps, master images, and output details.
2. Once the snapshot is ready, you can push it out from that master device to the other lines you want to push programs to. Just select the “Sync Cameras” drop down, choose the snapshot you want to sync, and the cameras that you want to apply the snapshot to.



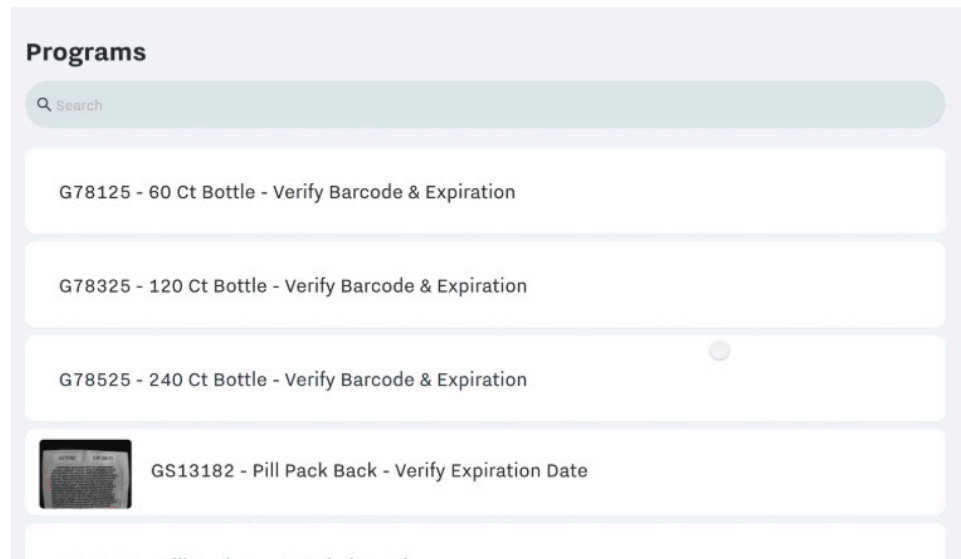
Once you complete this step, it will take a couple minutes for the changes to be pushed out to all the selected cameras. After the sync is complete, all programs will be available in a “read-only” mode with only the camera settings being adjustable.

Note: you cannot chain Cloud Sync between multiple cameras.

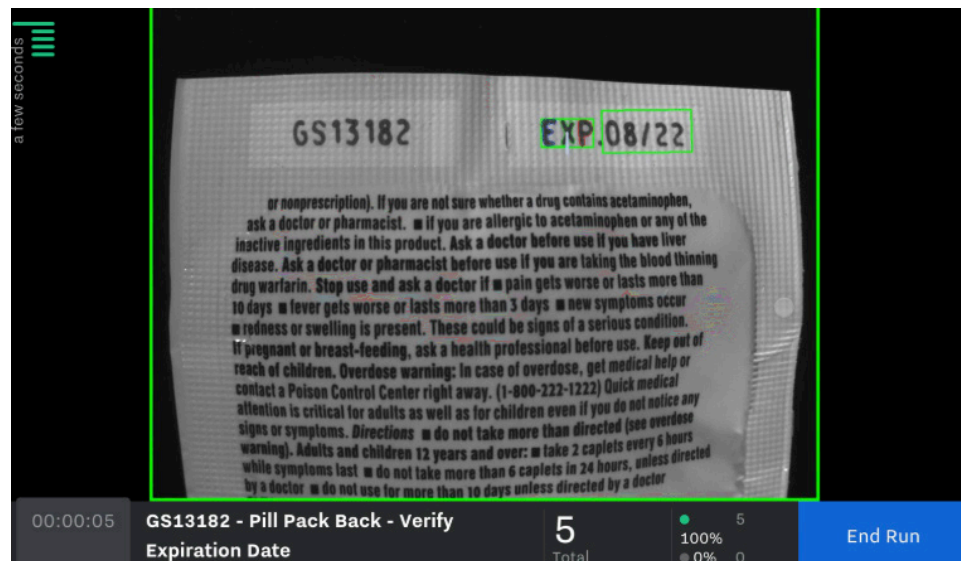
HMI Overview

Each VS2 has a built in Human Machine Interface (HMI) capability that allows users (such as line operators) start runs, view run progress (including viewing inspection details), and stopping runs. In VS2 terms, each time a program is started is called a Run. Unlike the other VS2 user interfaces, this feature is meant to be used on devices with touch screen functionality such as the HMI unit sold by Samsara or similar tablets.

The home page of the HMI is a program selection screen. This screen will list out all the programs that are currently built on the VS2 device. To start a run, locate the program you want to use and select it.



Once you select the program you want to start, you will be taken to a confirmation screen. Hit the start button to begin the run. The HMI will then shift to its operational mode. In this view, you will see updates as inspections are being completed.



To view details of any individual inspection, simply click on the related bar from the list on the left. Once the run is done, hit “End Run” to stop the program.

View Run Results from Dashboard

To view historical run results, navigate to the Runs tab for the VS2 device. In the table, you will be able to see all the runs that have occurred in the selected time period. To change the time period, adjust the settings in the upper right hand corner.

All Cameras

Run Example - Hazelnut March 2019 ◯

VS2 | G7RT8Z4SEH | ethernet: 10.6.38.203

Live View HMI **Runs** Programs Albums Labels Debug

All Runs

Mar 5, 2019 11:43 AM - Apr 4, 2019 12:43 PM

Runs 1 Total Run Time 15m 2s Avg. Items/min 42

Search runs Status 1 run

PROGRAM	ITEMS/MIN.	PASS (%)	NO READ (%)	REJECT (%)	TOTAL
73972 - Hazelnut Bar Mar 19, 4:43 PM-Mar 19, 4:58 PM	42	93%	0%	7%	639

Once you click into a run, you'll be taken to the cloud run report as seen below. This report shows all the inspection results over the entire run. Clicking on the individual boxes will pull up the individual result details with the image.

Overview Reports

All Runs | 73972 - Hazelnut Bar

Mar 19, 4:43 PM - Mar 19, 4:58 PM (15m 2s)

644 Total Items
43 Items/Minute
93% Pass
0% No Read
7% Reject

Inspected Items ☐ Hide Successful Sort Order ↑

	PASS	NO READ	REJECT
Fixture	644	0	0
Expiration Date	602	0	42