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iVu TG

Image Sensor Datasheet

Features

The iVu image sensor is used to monitor parts for type, size, orientation, shape, and location. The package consists of lighting, sensor, and lens, and display. Appropriate cables and mounting brackets can be ordered for each application. Additionally, other lenses, brackets, filters and external lights are available. Installation, setup, and configuration can be done quickly without requiring a PC to configure the sensor.

- No external PC required to configure the sensor
- Image processing expertise is not required
- Three sensors in one package—a match sensor that determines whether a pattern on a label or part matches some reference pattern; an area sensor that detects whether a particular feature (or features) is present or not; and an area sensor with tools that adjust for motion
- USB 2.0 compliant host provided for easy updating and diagnotistics
- Integrated color touch screen display
- High speed processing

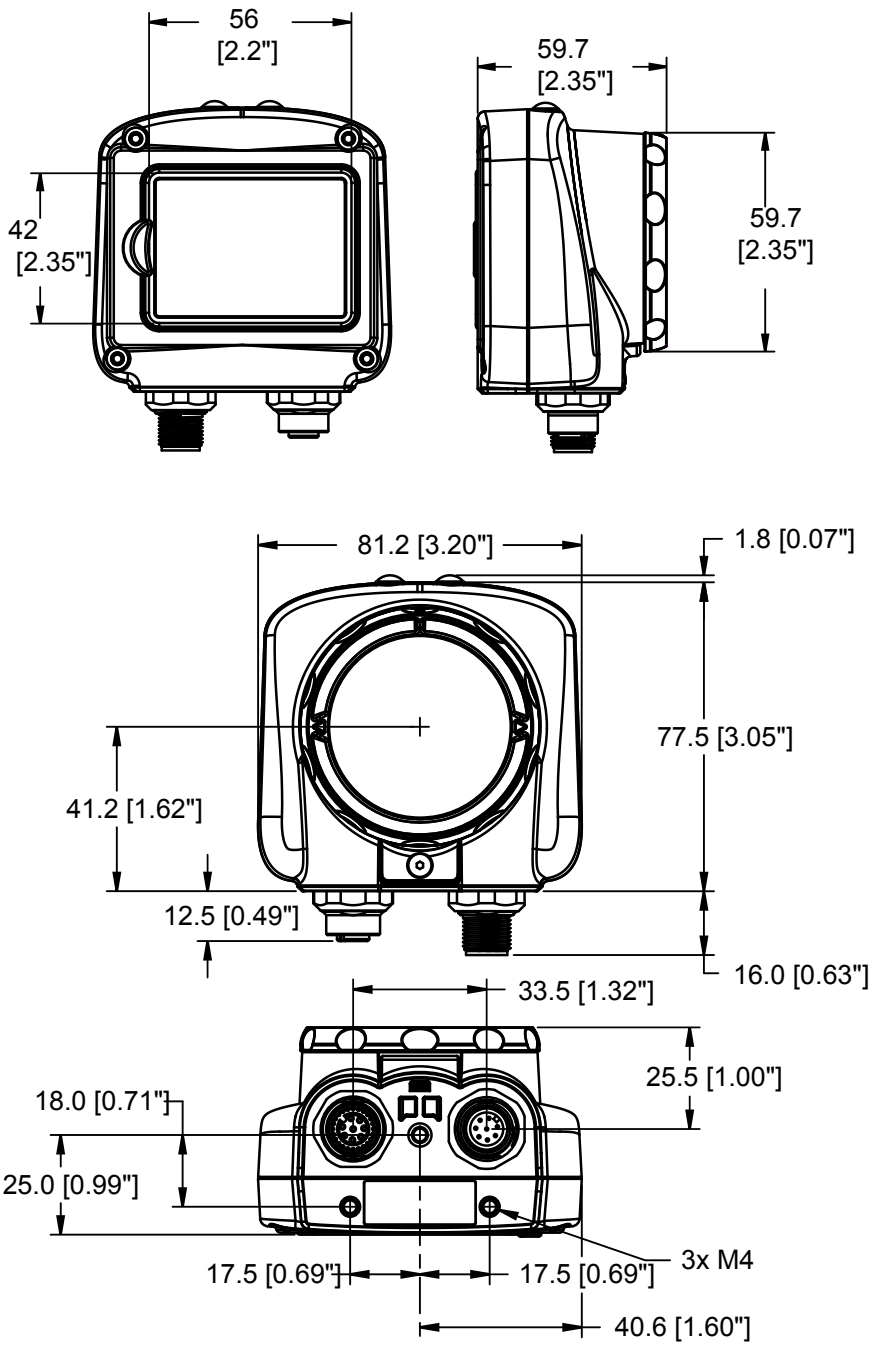
Models

Ring Light Options	Lens Options					Output Type
	4.3 mm	8 mm	12 mm	16 mm	25 mm	
None	**IVUTGNX04**	**IVUTGNX08**	**IVUTGNX12**	**IVUTGNX16**	**IVUTGNX25**	NPN
	IVUTGPX04	**IVUTGPX08**	**IVUTGPX12**	**IVUTGPX16**	**IVUTGPX25**	PNP
Red	**IVUTGNR04**	**IVUTGNR08**	**IVUTGNR12**	**IVUTGNR16**	**IVUTGNR25**	NPN
	IVUTGPR04	**IVUTGPR08**	**IVUTGPR12**	**IVUTGPR16**	**IVUTGPR25**	PNP
Blue	**IVUTGNB04**	**IVUTGNB08**	**IVUTGNB12**	**IVUTGNB16**	**IVUTGNB25**	NPN
	IVUTGPB04	**IVUTGPB08**	**IVUTGPB12**	**IVUTGPB16**	**IVUTGPB25**	PNP
Green	**IVUTGNG04**	**IVUTGNG08**	**IVUTGNG12**	**IVUTGNG16**	**IVUTGNG25**	NPN
	IVUTGPG04	**IVUTGPG08**	**IVUTGPG12**	**IVUTGPG16**	**IVUTGPG25**	PNP
IR	**IVUTGNI04**	**IVUTGNI08**	**IVUTGNI12**	**IVUTGNI16**	**IVUTGNI25**	NPN
	IVUTGPI04	**IVUTGPI08**	**IVUTGPI12**	**IVUTGPI16**	**IVUTGPI25**	PNP
White	**IVUTGNW04**	**IVUTGNW08**	**IVUTGNW12**	**IVUTGNW16**	**IVUTGNW25**	NPN
	IVUTGPW04	**IVUTGPW08**	**IVUTGPW12**	**IVUTGPW16**	**IVUTGPW25**	PNP

Sensor Specifications

Feature	Description
Power Connection	8-pin Euro-style (M12) male connector; accessory cable required for operation (see (*Power Cable — Required*).
USB 2.0 Host	8-pin Euro-style (M12) female connector; optional USB cable required for operation of USB Thumb Drive(see *USB Cable — Optional* on page 6).
Power Requirements	**Voltage:** 10-30V dc; **Current:** 800 mA maximum (exclusive of I/O load)
Output Configuration	NPN or PNP determined by model
Tools	Match, Area, Area with Motion
Demo Mode	Full tool functionality on canned images
Sensor Lock	Optional password protection
External Strobe Output	+ 5V dc
Integrated Ring Light	Red, IR, Green, Blue, White
Output Rating	150 mA
Display	68.5 mm (2.7") LCD Color Integrated Display 320 X 240 pixels
Acquisition	100 fps (frames per second) max.
Exposure Time	0.1 ms to 1.049 s
Imager	1/3 inch CMOS 752 X 480 pixels; adjustable Field of View (FOV)
Lens Mount	M12 X 1 mm thread; micro video lens 4.3, 6, 8, 12, 16, 25 mm
Construction	Black Valox™ sensor housing; acrylic window
Environmental Rating	IP67
Operating Conditions	**Stable Ambient Temperature:** 0° to + 50° C (+32° to + 122° F)
Certifications	CE

Dimensions


56
[2.2"]
59.7
[2.35"]
42
[2.35"]
59.7
[2.35"]
81.2 [3.20"]
1.8 [0.07"]
77.5 [3.05"]
41.2 [1.62"]
12.5 [0.49"]
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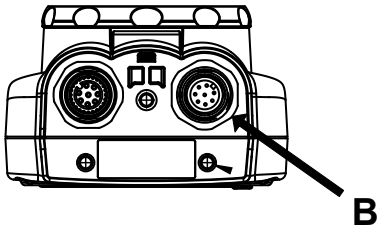
18.0 [0.71"]
25.0 [0.99"]
3x M4
17.5 [0.69"]
17.5 [0.69"]
40.6 [1.60"]

Power and I/O Cable Connections for the IVu TG with Integrated Display

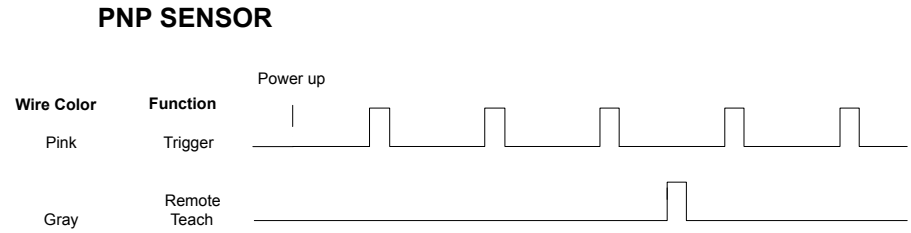
	Pin #	Wire Color	Description	Direction
	2	Brown	10-30V dc	Input
	7	Blue	Common (Signal Ground)	Input
	6	Pink	External Trigger	Input
	5	Gray	Remote Teach	Input
	1	White	Pass/Fail	Output
	8	Red	Ready	Output
	4	Yellow	Strobe Out (5V dc only)	Output
	3	Green	*Reserved*	Output (Do not connect)

iVu Trigger, Remote Teach, and I/O Waveforms

The iVu has two input signals—Trigger and Remote Teach. The default setting for PNP sensors is to detect the Trigger or Remote Teach input on the low to high transition. For NPN sensors the default setting is to detect the Trigger or Remote Teach input on the high to low transition. This setting can be changed in the Input Polarity screen on the sensor.

iVu PNP Trigger and Remote Teach Input Waveforms

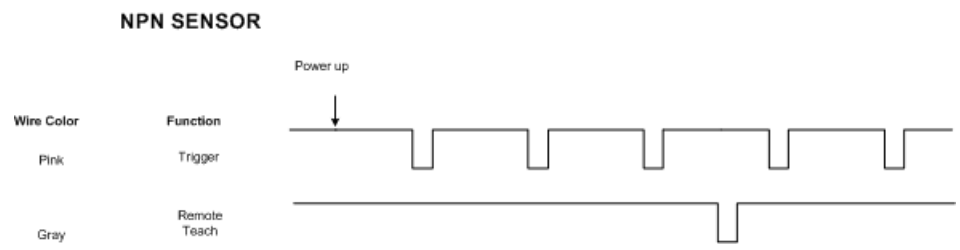
The iVu Trigger and Remote Teach input waveforms are shown below.



The PNP sensor triggers from low to high, and Remote Teach behaves electrically like trigger (see above).

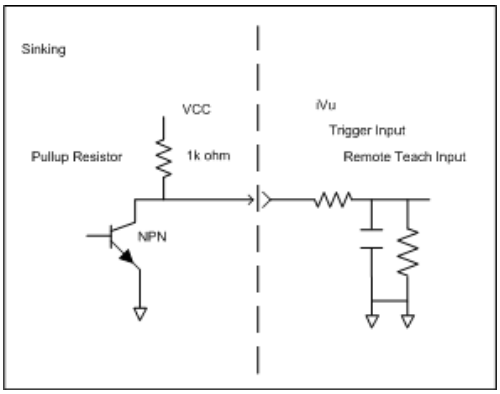
iVu NPN Trigger and Remote Teach Input Waveforms

The iVu Trigger and Remote Teach input waveforms are shown below.



iVu with Integrated Display

By default, the NPN version of the sensor triggers from high to low, and Remote Teach behaves electrically like trigger. If using an NPN trigger sensor, put a pull-up resistor, rated approximately 1k ohm, between the sensor's positive (+) voltage and the sensor's input as shown below.



Remote Teach

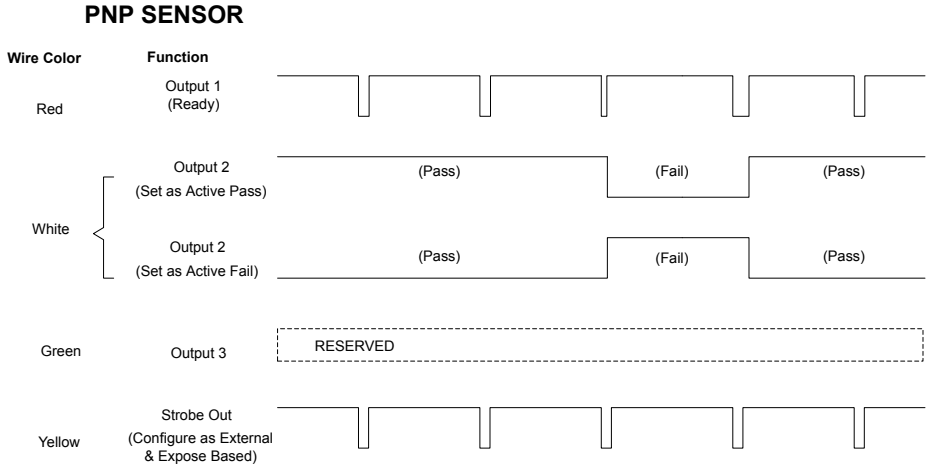
The Remote Teach function is a method of remotely updating inspection parameters while the iVu sensor is running. Remote Teach is only available when the iVu is configured as a Match sensor. The sequence of events for executing a Remote Teach as follows:

1. With the sensor Ready, pulse the Remote Teach line.
2. The sensor recognizes that the Remote Teach line has been pulsed and waits for the next valid trigger.
3. At the next valid trigger, Ready goes inactive (the Green Ready LED shuts OFF), and the sensor acquires a new image.
4. The sensor learns the new pattern and performs the analysis.

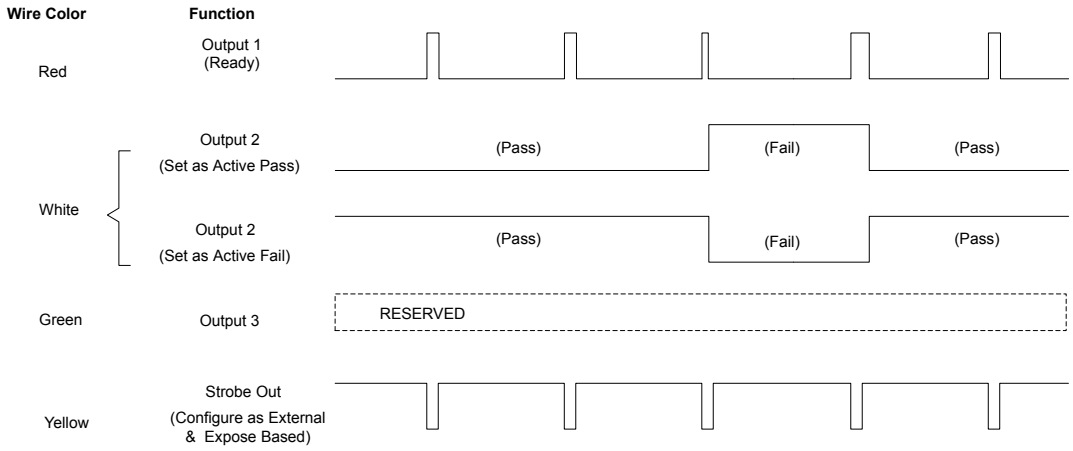
iVu Output Waveforms

Output Waveforms

Below are the iVu output waveforms.



NPN SENSOR



Power Cables

Model	Length	Description
MQDC2S-806	2 m (6')	8-pin cable, straight
MQDC2S-815	5 m (15')	
MQDC2S-830	9 m (30')	
MQDC2S-850	15 m (50')	
MQDC2S-806RA	2 m (6')	8-pin cable, right angle
MQDC2S-815RA	5 m (15')	
MQDC2S-830RA	9 m (30')	
MQDC2S-850RA	15 m (50')	

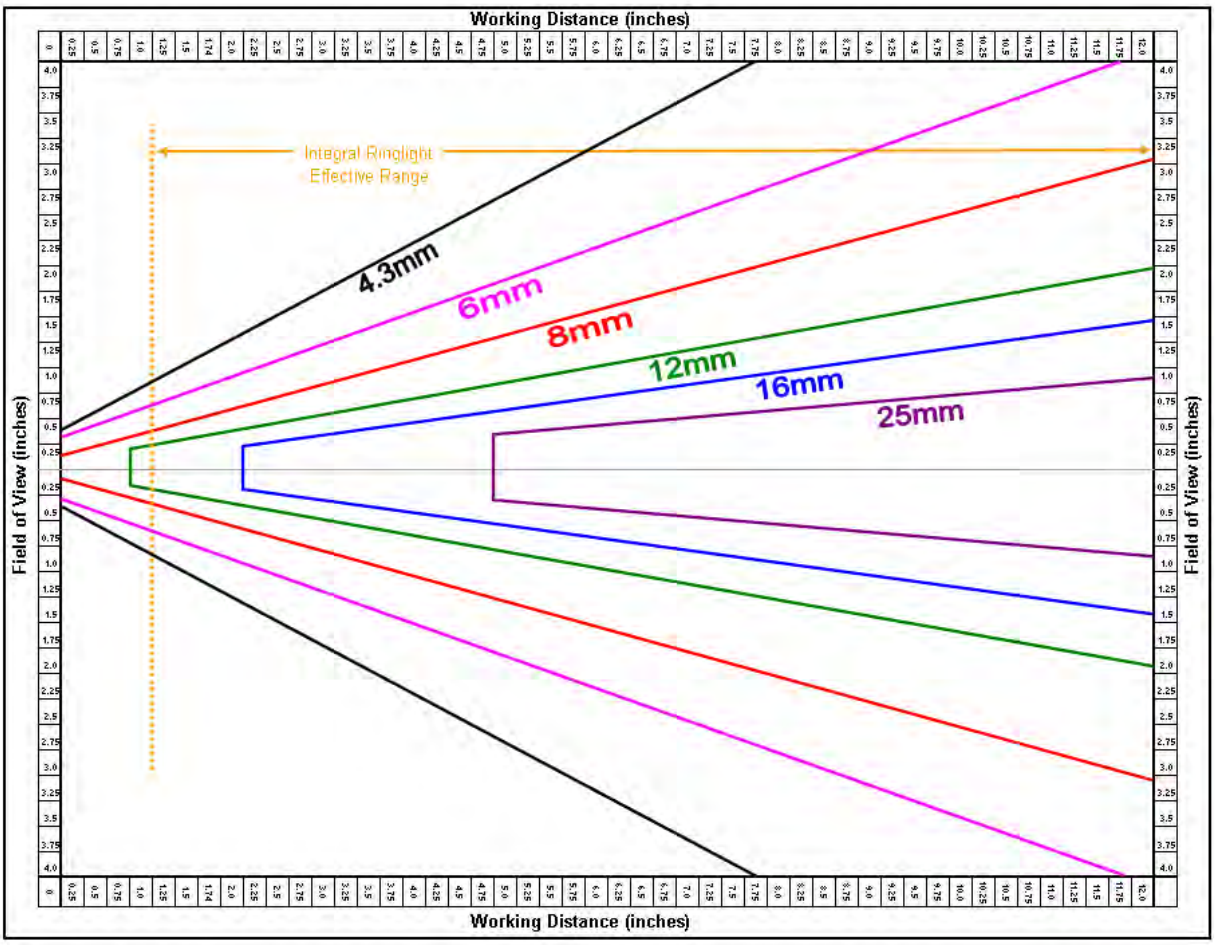
USB Cable — Optional

Model	Length	Description
MQDEC-8005-USB	.15 m (6")	USB cable, straight
MQDEC-801-USB	.30 m (1')	
MQDEC-803-USB	.90 m (3')	
MQDEC-810-USB	3 m (10')	
MQDEC-8005RA-USB	.15 m (6")	USB cable, right angle
MQDEC-801RA-USB	.30 m (1')	
MQDEC-803RA-USB	.90 m (3')	
MQDEC-810RA-USB	3 m (10')	

Lens Choices

Model	Lens Description
LMF04	4.3 mm lens
LMF06	6 mm lens
LMF08	8 mm lens
LMF12	12 mm lens
LMF16	16 mm lens
LMF25	25 mm lens

iVu Lens Chart



Filters — Optional

Model	Description
FLTMR	Red filter kit
FLTMB	Blue filter kit
FLTMG	Green filter kit
FLTMI	IR Filter kit

Bracket Choices

Model	Description	Mounting Bracket
SMBIVURAL	Right angle, left mounting bracket	
SMBIVURAR	Right angle, right mounting bracket	
SMBIVUB	Bottom mounting bracket kit	
SMBIVUU	U-shape mounting bracket kit **Note:** Banner recommends that cables with right-angle connectors be used with this bracket kit.	

iVu TG Image Sensor

Sensor Reference

The purpose of this document is to provide a quick reference to the icons and the menu hierarchy used in the iVu Series sensor.

Main Menu

- System
  - Sensor Type
    - Match
    - Area
    - Blemish
    - Demo Mode
  - Sensor Configuration
    - Save to USB
    - Load from USB
    - Reset to Defaults
    - Match Time Limit*
  - Sensor Information
  - Lock Sensor
  - Motion
  - Discreet I/O
    - Input Polarity
    - Output 1
    - Output 2
  - Display Settings
    - Fail Hold Time
    - LCD Timeout
    - Touch Calibration
    - Advanced
  - Reboot Sensor
  - Firmware Update
  - Language

*When Sensor Type=Match

- Inspection
  - Match
    - Percent Match
    - Rotation Range
    - Pass Count
- Inspection
  - Motion
    - Number of Edges
    - Sensitivity
    - Rotation
  - Area
    - ROI Type
    - Intensity Range
    - Area Range
    - Pass Count
- Inspection
  - Motion
    - Number of Edges
    - Sensitivity
    - Rotation
  - Blemish
    - ROI Type
    - Sensitivity
    - Edge Length Range
    - Pass Count

Menu items in gray only display if Motion is Enabled

- Imager
  - Auto Exposure
  - Exposure
  - Gain
  - Trigger
    - External
    - Internal
    - Free Run
  - Focus
  - Strobe
    - External
    - Internal
  - FOV
    - Maximize FOV
    - Modify FOV

- Logs
  - Inspection Logs
    - View Logs
    - Setup
  - System Logs

Locked Sensor Menu Options

- Locked
  - Inspection Logs
  - System Logs
  - Unlock Sensor

Icon Reference

Action Icons

Icon	Description
	The Main Menu icon is displayed on the bottom-left corner of the sensor display on the Home screen. It provides access to sub-menus that are used to set up the sensor.
	The Inspection menu icon is located on the the Main Menu, and provides access to parameters that need to be set for an inspection.
	The Imager menu icon is on the Main Menu, and lists parameters that affect the characteristics of the captured image.
	The System menu icon is on the Main Menu, and is used to manage the sensor.
	The Logs menu icon is on the Main Menu, and is used to set up, view, and save Inspection and System Logs.
	The Home Screen icon is displayed in the upper-left corner of the sensor display when viewing menus and parameter screens in the Main Menu. It is used to quickly return to the Home Screen.
	The Display Annotations icon is one of three icons displayed in the upper-left corner of the sensor while monitoring inspections on the Home Screen. Click this icon to highlight features that the sensor finds.
	The Hide Annotations icon is one of three icons displayed in the upper-left corner of the sensor while monitoring inspections on the Home Screen. Click this icon to disable highlighting.
	The Show Statistics icon is one of three icons displayed in the upper-left corner of the sensor while monitoring inspections. Click this icon to show inspection results and input parameters.
	The Hide System Log Details icon is one of the icons displayed in the upper-left corner of the System Logs screen. Click this icon to hide the time stamp for the System Logs.
	The Show System Log Details icon is one of the icons displayed in the upper-left corner of the System Logs screen. Click this icon to show the time stamp for the System Logs.
	The Go Back icon is located on the lower-left of the screen while working in the Main Menu. The Go Back icon is used to return to the previous screen or menu.
	The Help button is located in the upper-right of the screen and provides context-sensitive help for each screen.
	The Manual Trigger icon is located on the lower-right of the sensor display on the Home screen and is used to manually capture a new image.
	The Save icon is used to save data to USB drive, and is available at the bottom of screens such as the View Logs and System Logs screens.
	The Touch Calibration screen displays the Touch Calibration point at various locations on the screen. Every time the icon displays, the user taps the center of the icon to calibrate the screen.
	The Zoom Out icon is located on the right of the screen and is used to reduce magnification of the image being displayed.

Icon	Description
	The Zoom In icon is located on the right of the screen and is used to magnify the image being displayed.
	The Intensity Selector is located on the left of the of the Intensity Range screen and is used to select the shade of one of the objects of interest.
	The Decrement icon decreases the currently displayed parameter value by one interval. To quickly decrement the value, press and hold the icon.
	The Increment icon increases the currently displayed parameter value by one interval. To quickly increment the value, press and hold the icon.

Display Icons

Icon	Description
	The Inspection Passed icon is located in the upper-left of the screen, and indicates that the last inspection passed its test conditions.
	One of the possible Inspection Failed icons located in the upper-left of the screen, it indicates that the last inspection failed.
	One of the possible Inspection Failed icons located in the upper-left of the screen, it indicates that the inspection failed because the number of objects exceeded the test count.
	One of the possible Inspection Failed icons located in the upper-left of the screen, it indicates that the inspection failed because there were fewer objects than specified by the test count.
	One of the possible Inspection Failed icons located in the upper-left of the screen, it indicates that the inspection failed because the inspection timed out.
	One of the possible Inspection Failed icons located in the upper-left of the screen, it indicates that the sensor is in fail hold mode.
	The Sensor Locked icon is located in the upper-left of the screen, and indicates that the sensor is in a locked state. If no icon is displayed, the sensor is unlocked.