MICROSCAN

Vision HAWK Smart Camera Guide

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PREFACE

Welcome!

Purpose of This Manual

This manual contains detailed information about the Vision HAWK Smart Camera.

Manual Conventions

The following typographical conventions are used throughout this manual.

- Items emphasizing important information are **bolded**.
- Menu selections, menu items and entries in screen images are indicated as: Run (triggered), Modify..., etc.

Preface

CHAPTER 1 Introduction

FIGURE 1–1. Vision HAWK Smart Camera, C-Mount and Standard Models

Product Summary

The Vision HAWK Smart Camera is a compact industrial smart camera that provides powerful machine vision capabilities with a small form factor and intuitive software interface. The Vision HAWK is designed for industrial environments where IP65/67 enclosure and rugged M12 connectivity are required.

Fully-integrated I/O and communications make the Vision HAWK easy to incorporate in virtually any machine vision application. Patented liquid lens autofocus and modular optical zoom enables the Vision HAWK to inspect objects at distances from 33 mm to 2 m and beyond.

Pressing the AutoVISION button at the back of the Vision HAWK enables real time dynamic autofocus. When an object is centered in the field of view and the AutoVISION button is pressed, the camera automatically adjusts focal distance and sets internal parameters to optimize image captures.

AutoVISION software, designed for use with the Vision HAWK, provides an intuitive interface, step-by-step configuration, and a library of presets that allow easy setup and deployment. For more complex vision applications, the system can be upgraded from AutoVISION to Visionscape.

Features and Benefits

- Both Standard and C-Mount versions available
- World's first vision system with liquid lens autofocus (standard models)
- Integrated lighting (standard models)
- Integrated Ethernet
- Flexible programming options for custom applications
- AutoVISION button for automatic targeting, calibration, and triggering
- Simplified configuration with AutoVISION software
- Fully scalable with Visionscape
- Applications can be ported to Visionscape PC-based machine vision

Applications

- Automotive assembly verification
- Part identification
- Label positioning
- Contents verification
- Electronics assembly verification and identification
- Semiconductor packaging and component inspection
- Auto ID (Data Matrix and other 2D symbologies, 1D, OCR)

Package Contents

Before you install AutoVISION software and connect your Vision HAWK Smart Camera, please take a moment to confirm that the following items are available:

- Vision HAWK Smart Camera — Your package contains one of the available models listed in Table 1–1
- AutoVISION Software Installation USB Drive
- Required accessories such as a power supply or power cable

Vision HAWK Smart Camera Models

Table 1–1 lists and describes the Vision HAWK Smart Camera models.

TABLE 1–1. Vision HAWK Smart Camera Models

Part Number	Vision HAWK Smart Camera Model
GMV-6800-1000G	Vision HAWK, SXGA, AutoVISION, C-Mount
GMV-6800-1002G	Vision HAWK, SXGA, AutoVISION + Visionscape, C-Mount
GMV-6800-1010G	Vision HAWK, WVGA, AutoVISION, C-Mount
GMV-6800-1012G	Vision HAWK, WVGA, AutoVISION + Visionscape, C-Mount
GMV-6800-1110G	Vision HAWK, WVGA, Built-In Light, AutoVISION, 15° Lens
GMV-6800-1210G	Vision HAWK, WVGA, Built-In Light, AutoVISION, 30° Lens
GMV-6800-1310G	Vision HAWK, WVGA, Built-In Light, AutoVISION, 45° Lens
GMV-6800-1112G	Vision HAWK, WVGA, Built-In Light, AutoVISION + Visionscape, 15° Lens
GMV-6800-1212G	Vision HAWK, WVGA, Built-In Light, AutoVISION + Visionscape, 30° Lens
GMV-6800-1312G	Vision HAWK, WVGA, Built-In Light, AutoVISION + Visionscape, 45° Lens
GMV-6800-1100G	Vision HAWK, SXGA, Built-In Light, AutoVISION, 15° Lens
GMV-6800-1200G	Vision HAWK, SXGA, Built-In Light, AutoVISION, 30° Lens
GMV-6800-1300G	Vision HAWK, SXGA, Built-In Light, AutoVISION, 45° Lens
GMV-6800-1102G	Vision HAWK, SXGA, Built-In Light, AutoVISION + Visionscape, 15° Lens
GMV-6800-1202G	Vision HAWK, SXGA, Built-In Light, AutoVISION + Visionscape, 30° Lens
GMV-6800-1302G	Vision HAWK, SXGA, Built-In Light, AutoVISION + Visionscape, 45° Lens

Part Number Structure

GMV	6800						
General Machine Vision	Vision HAWK	**Comm**	**Lens**	**Sensor**	**Options**	**RoHS**	**Custom**
		1 = Ethernet	0 = C-Mount	0 = CCD (SXGA)	0 = AutoVISION	G = RoHS compliant	0 to 99
			1 = 15° Optics	1 = CMOS (WVGA)	1 = Custom		
			2 = 30° Optics		2 = Visionscape		
			3 = 45° Optics		3 = Custom + Visionscape		

CHAPTER 2 System Components

This section contains information about system components as well as information to help you connect the Vision HAWK Smart Camera. Specific information describes connectors, adapters, cables, pinouts, and signals.

Note: There are no user-serviceable parts inside.

Hardware Components

Table 2-1 lists Vision HAWK Smart Camera hardware components.

TABLE 2–1. Vision HAWK Smart Camera Hardware Components

Part Number	Description
Cameras	
GMV-6800-1000G	Vision HAWK, SXGA, AutoVISION, C-Mount
GMV-6800-1002G	Vision HAWK, SXGA, AutoVISION + Visionscape, C-Mount
GMV-6800-1010G	Vision HAWK, WVGA, AutoVISION, C-Mount
GMV-6800-1012G	Vision HAWK, WVGA, AutoVISION + Visionscape, C-Mount
GMV-6800-1110G	Vision HAWK, WVGA, Built-In Light, AutoVISION, 15° Lens
GMV-6800-1210G	Vision HAWK, WVGA, Built-In Light, AutoVISION, 30° Lens
GMV-6800-1310G	Vision HAWK, WVGA, Built-In Light, AutoVISION, 45° Lens
GMV-6800-1112G	Vision HAWK, WVGA, Built-In Light, AutoVISION + Visionscape, 15° Lens
GMV-6800-1212G	Vision HAWK, WVGA, Built-In Light, AutoVISION + Visionscape, 30° Lens
GMV-6800-1312G	Vision HAWK, WVGA, Built-In Light, AutoVISION + Visionscape, 45° Lens

TABLE 2–1. Vision HAWK Smart Camera Hardware Components (Continued)

Part Number	Description
GMV-6800-1100G	Vision HAWK, SXGA, Built-In Light, AutoVISION, 15° Lens
GMV-6800-1200G	Vision HAWK, SXGA, Built-In Light, AutoVISION, 30° Lens
GMV-6800-1300G	Vision HAWK, SXGA, Built-In Light, AutoVISION, 45° Lens
GMV-6800-1102G	Vision HAWK, SXGA, Built-In Light, AutoVISION + Visionscape, 15° Lens
GMV-6800-1202G	Vision HAWK, SXGA, Built-In Light, AutoVISION + Visionscape, 30° Lens
GMV-6800-1302G	Vision HAWK, SXGA, Built-In Light, AutoVISION + Visionscape, 45° Lens
Demo Kit	
98-000215-01	Demo Kit (Power Supply, Camera Stand, Ethernet Host Cable, Carrying Case, Documentation)
Power Supplies	
97-000003-01	Power Supply, M12 12-pin Socket, 1.3 m
97-000003-02	Power Supply, M12 12 pin Plug, 1.3m
Communication Devices and Cables	
98-000103-01	QX-1 Interface Device
61-000148-01	Cordset, Common, M12 12 Pin, Socket (Ultralock) to M12 12 Pin, Plug (Ultralock), 3M
61-000148-02	Cordset, Common, M12 12 Pin, Socket (Screw-on) to M12 12 Pin Plug (Screw-on), 3M
61-000162-01	Cordset, Common, M12 12 Pin, Socket (Ultralock) to M12 12 Pin, Plug (Ultralock), 1M
61-000162-02	Cordset, Common, M12 12 Pin, Socket (Screw-on) to M12 12 Pin Plug (Screw-on), 1M
61-000153-01	Cordset, Host, Serial, M12 12 Pin Socket (Ultralock) to DB9 Socket, 1M
61-000153-02	Cordset, Host, Serial M12 12 pin Socket (Screw-on) to DB9 Socket, 1M
61-000164-01	Cordset, Host, Serial, M12 12 pin Socket (Ultralock) to DB9 Socket, 3M
61-000164-02	Cordset, Host, Serial, M12 12 pin Socket (Screw-on) to DB9 Socket, 3M
61-000152-01	Cordset, Host, Serial M12 12 pin Plug (Ultralock) to DB9 Socket, 1M
61-000152-02	Cordset, Host, Serial, M12 12 pin Plug (Screw-down) to DB9 Socket, 1M
61-000165-01	Cordset, Host, Serial M12 12 pin Plug (Ultralock) to DB9 Socket, 3M
61-000165-02	Cordset, Host, Serial M12 12 pin Plug (Screw-on) to DB9 Socket, 3M
61-000163-01	Cordset, Host, Ethernet, M12 8 pin Plug (Ultralock) to RJ45, 3M
61-000163-02	Cordset, Host, Ethernet, M12 8 pin Plug(Screw-on) to RJ45, 3M
61-000160-01	Cordset, Host, Ethernet, M12 8 pin Plug (Ultralock) to RJ45, 1M
61-000160-02	Cordset, Host, Ethernet, M12 8 pin Plug (Screw-on) to RJ45, 1M
61-000161-01	Cordset, M12 12 pin Plug (Ultralock) to MS-5100, 3M
61-000161-02	Cordset, M12 12 pin Plug (Screw-on) to MS-5100, 3M
61-000172-01	Cordset, M12 12 pin Plug (Ultralock) to M12 12 pin Socket (Ultralock) to DB25 Plug
61-000158-03	Cordset, M12 12 Pin Plug & Socket (Ultralock) to MS-Connect 210, RS-232, 2M
61-000158-04	Cordset, M12 12 Pin Plug & Socket (Ultralock) to MS-Connect 210, RS-422/485, 2M
61-000166-01	Cordset, M12 12 Pin Plug (Ultralock) to Flying Leads, 3M
61-000166-02	Cordset, M12 12 Pin Plug (Screw-on) to Flying Leads, 3M

TABLE 2–1. Vision HAWK Smart Camera Hardware Components (Continued)

Part Number	Description
61-000167-01	Cordset, M12 12 Pin Socket (Ultralock) to Flying Leads, 3M
61-000167-02	Cordset, M12 12 Pin Socket (Screw-on) to Flying Leads, 3M
61-000207-01	Cordset, C-Mount-to-Smart Series Light
FIS-0210-0001G	MS-Connect 210, Connectivity Box with Display
FIS-0210-0002G	MS-Connect 210, Connectivity Box
FIS-0210-0003G	MS-Connect 210, Connectivity Box with Display and Ethernet
FIS-0210-0004G	MS-Connect 210, Connectivity Box with Ethernet
98-000013-04	Relay Module, 120VAC, 3 Amp Output, Series 70, Type SM, for MS-Connect 210
98-000013-05	Relay Module, 240VAC, 3 Amp Output, Series 70, Type SM for MS-Connect 210
98-000013-06	Relay Module, 24VDC, 3 Amp Output, Series 70, Type SM for MS-Connect 210
Accessories	
98-000143-01	Adapter Plate Kit
98-000148-01	L-Bracket Kit
98-000144-01	Right Angle Mirror Kit
98-000146-01	Window Replacement Kit
98-000147-01	15° Lens Kit
98-000147-02	30° Lens Kit
98-000147-03	45° Lens Kit
98-000205-01	Glass WIndow Kit with Infrared (IR) Filter
98-000206-01	Glass Window Kit
98-500006-01	Mounting Plate Kit, Flat, Custom Surfaces
20-610024-01	Trigger Connector, 4-pin Plug (screw terminal and field-wireable) (for self-wiring)
98-000037-01	Extension Kit, All Cameras, 6 inch
98-000054-01	Kit, Mounting Stand Base Plate, Small
98-000016-01	Mounting Arm/Adapter Kit, 6 inch
99-000056-01	Accessory, Bracket, DOAL 50 to Vision HAWK
99-000058-01	Accessory, Bracket, DOAL 75 to Vision HAWK
99-000060-01	Accessory, Bracket, DOAL 100 to Vision HAWK
99-000061-01	Accessory, Bracket, DOAL to C-MOUNT Vision HAWK
99-000050-01	Accessory, Bracket,R-100 to Vision HAWK
99-000052-01	Accessory, Bracket,R-60/70 to Vision HAWK
99-000049-01	Accessory, Bracket,R-100 to C-MOUNT Vision HAWK
99-000051-01	Accessory, Bracket,R-60/70 to C-MOUNT Vision HAWK
98-92800471	5MM Extension Tube for C-Mount Lenses
98-CO206	Lens Extension Tube Set 0.5, 1, 5, 10, 20, 40mm
98-92800571	Lens 8mm F/1.4-16, FT 25.5mm P 0.5mm, 2/3" C-MNT

TABLE 2–1. Vision HAWK Smart Camera Hardware Components (Continued)

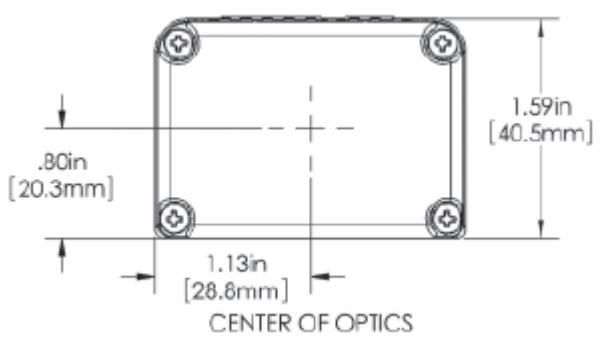
Part Number	Description
98-92800572	Lens 12mm F/1.8-16, FT 25.5mm P 0.5mm, 2/3" C-MNT
98-92800573	Lens 16mm F/1.4-16, FT 25.5mm P 0.5mm, 2/3" C-MNT
98-92800574	Lens 25mm F/1.6-16, FT 25.5mm P 0.5mm, 2/3" C-MNT
98-92800575	Lens 35mm F/2.1-22, FT 25.5mm P 0.5mm, 2/3" C-MNT
98-92800576	Lens 50mm F/2.8-22, FT 25.5mm P 0.5mm, 2/3" C-MNT
98-92800577	Lens 75mm F/3.9-32, FT 25.5mm P 0.5mm, 2/3" C-MNT
98-92800311	Lens, Skylight UV Filter 25.5mm Thread
98-92800371	Polarizing Filter 25.5mm Thread
98-000218-01	Lens Protection Housing, Standard Length (up to 48mm)
98-000226-01	Lens Protection Housing, Long (up to 72mm)
Object Detectors	
99-000020-01	Photo Sensor, M12 4pin Plug, NPN, Dark Off, 2m
99-000020-02	Photo Sensor, M12 4-pin Plug, NPN, Dark On, 2 m
Documentation	
37-000010-01	Microscan Tools Drive (Software, User's Manuals, Quick Start Guides, Configuration Guides, links to other documents on Microscan website

Note: Additional hardware components are available in the Microscan Product Pricing Catalog.

Standard Vision HAWK Front

Figure 2-1 shows the front of the Vision HAWK Smart Camera.

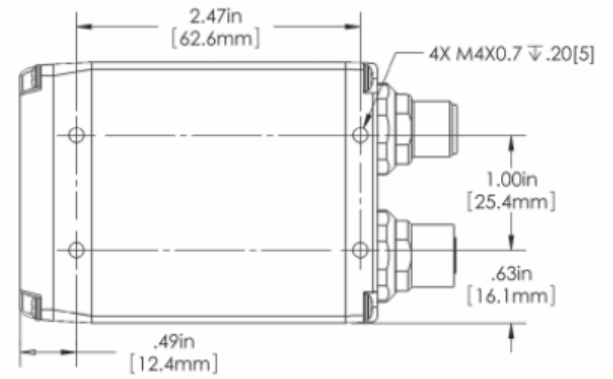
FIGURE 2–1. Front



Standard Vision HAWK Base

Figure 2–2 shows the base of the Vision HAWK Smart Camera.

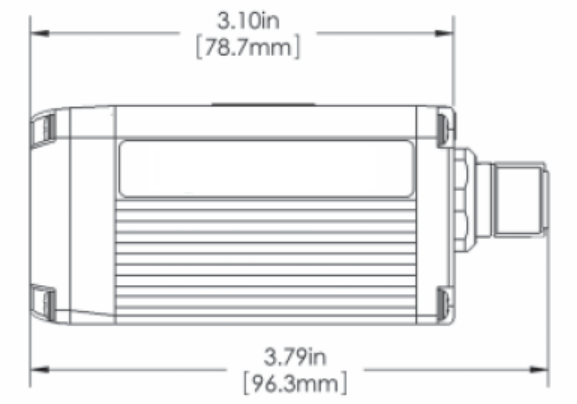
FIGURE 2–2. Base



Standard Vision HAWK Side

Figure 2-3 shows the side of the Vision HAWK Smart Camera.

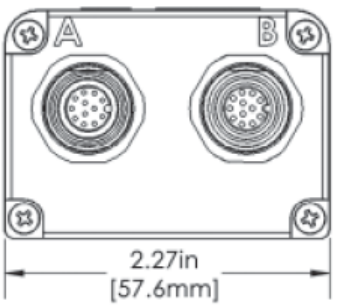
FIGURE 2–3. Side



Standard Vision HAWK Back

Figure 2-4 shows the back of the Vision HAWK Smart Camera.

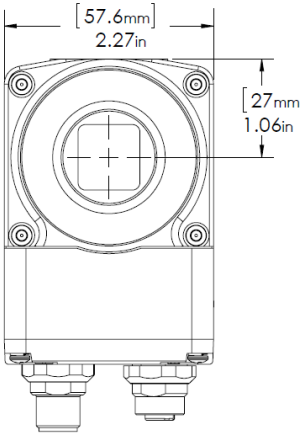
FIGURE 2–4. Back



Vision HAWK C-Mount Front

Figure 2-5 shows the front of the Vision HAWK C-Mount Smart Camera.

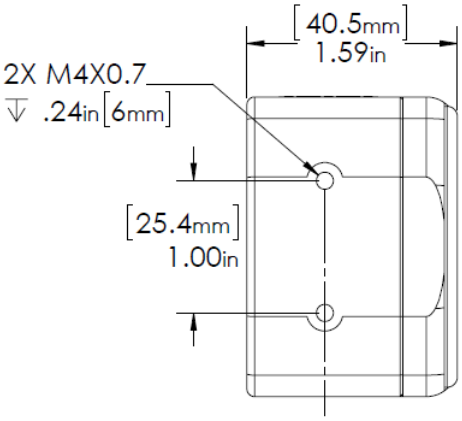
FIGURE 2–5. Front



Vision HAWK C-Mount Base

Figure 2–6 shows the top of the Vision HAWK C-Mount Smart Camera.

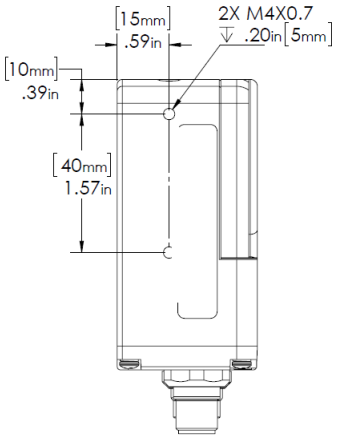
FIGURE 2–6. Top



Vision HAWK C-Mount Side

Figure 2-7 shows the side of the Vision HAWK C-Mount Smart Camera.

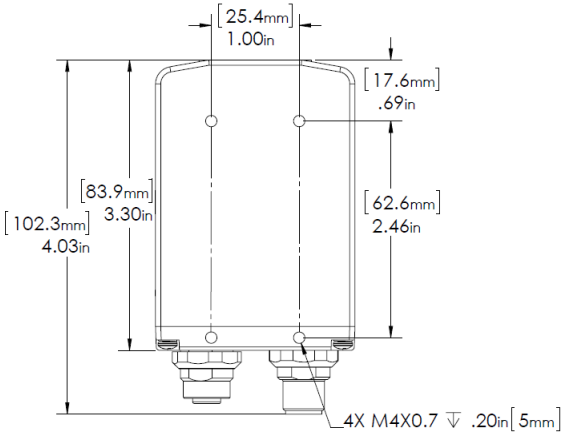
FIGURE 2–7. Side



Vision HAWK C-Mount Back

Figure 2-8 shows the back of the Vision HAWK C-Mount Smart Camera.

FIGURE 2–8. Back



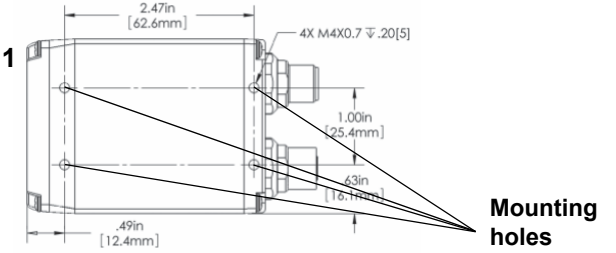
Important Label Information

Each Vision HAWK Smart Camera has its own label, which contains important information about that camera.

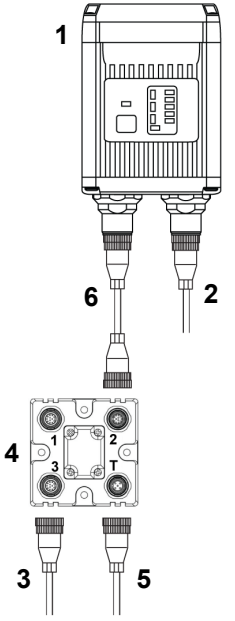
- P/N – The Microscan part number of your Vision HAWK Smart Camera.
- S/N — The serial number of your Vision HAWK Smart Camera.
- MAC — The MAC address of your Vision HAWK Smart Camera.

Mounting and Wiring the Vision HAWK Smart Camera

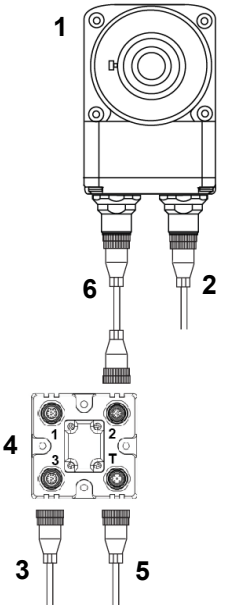
- Mount the camera (**1**) securely as required by the application.



- Connect the Ethernet cable (**2**) from “B” on the camera (**1**) to the network.
- Connect the power supply cable (**3**) to “3” on the QX-1 (**4**).
- Connect the trigger (**5**) to “T” on the QX-1 (**4**).
- Connect the “Common” cable (**6**) from “A” on the camera (**1**) to “2” on the QX-1 (**4**).
- Plug in the power supply (**3**).



Standard Vision HAWK

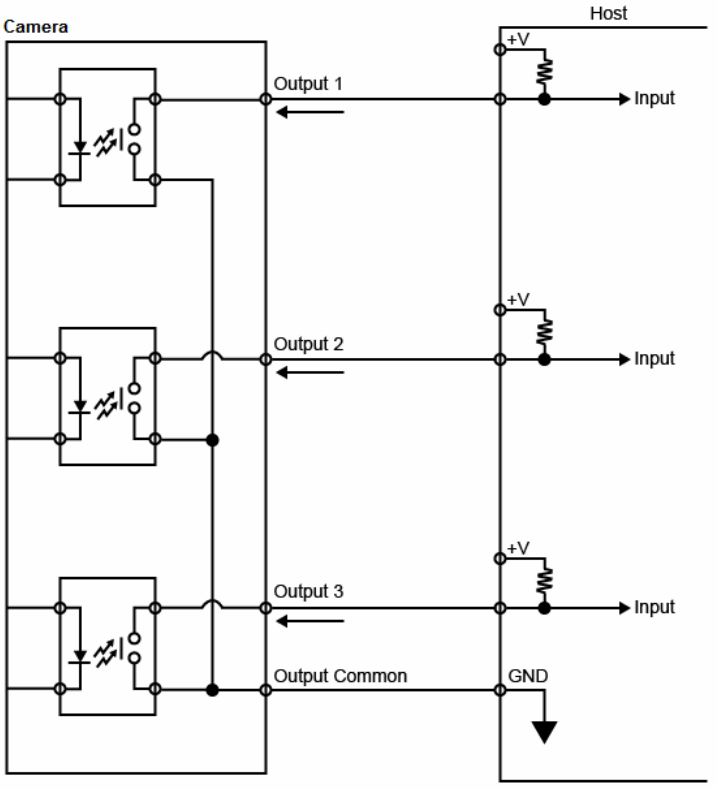


Vision HAWK C-Mount

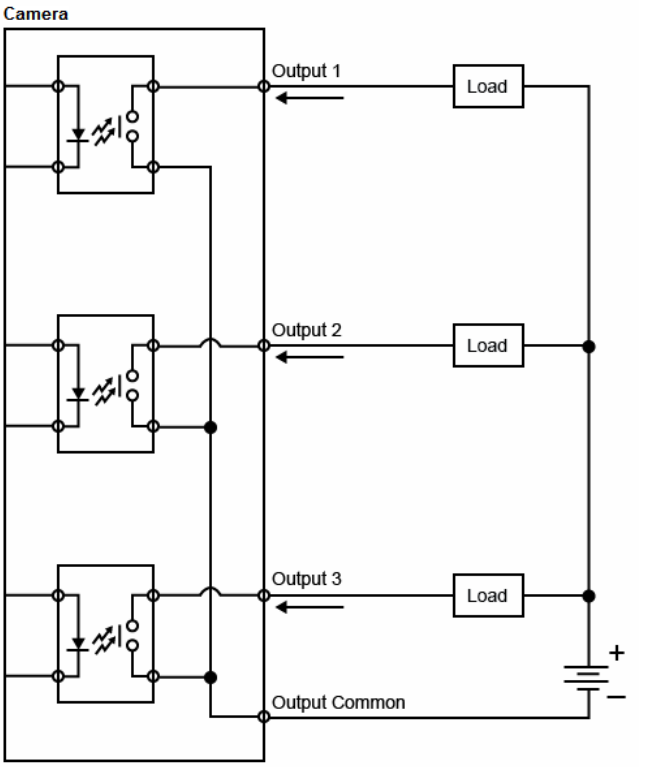
Optoisolated Outputs

The reader has optoisolated outputs that can transfer signals from the camera to peripherals. Outputs can be configured as either NPN or PNP, but NPN and PNP cannot be mixed in a system, because the output common is shared by all outputs.

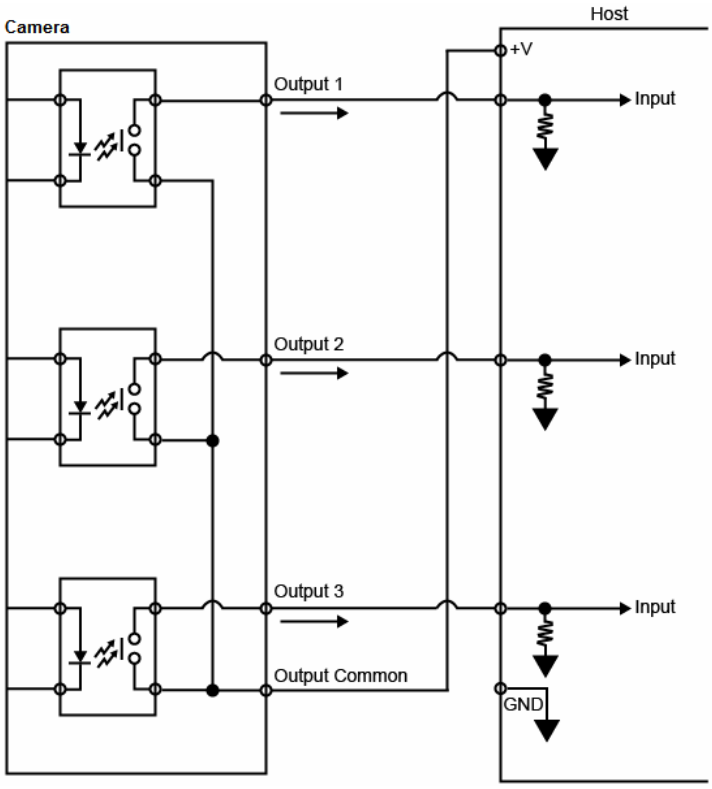
NPN Output for Host Input



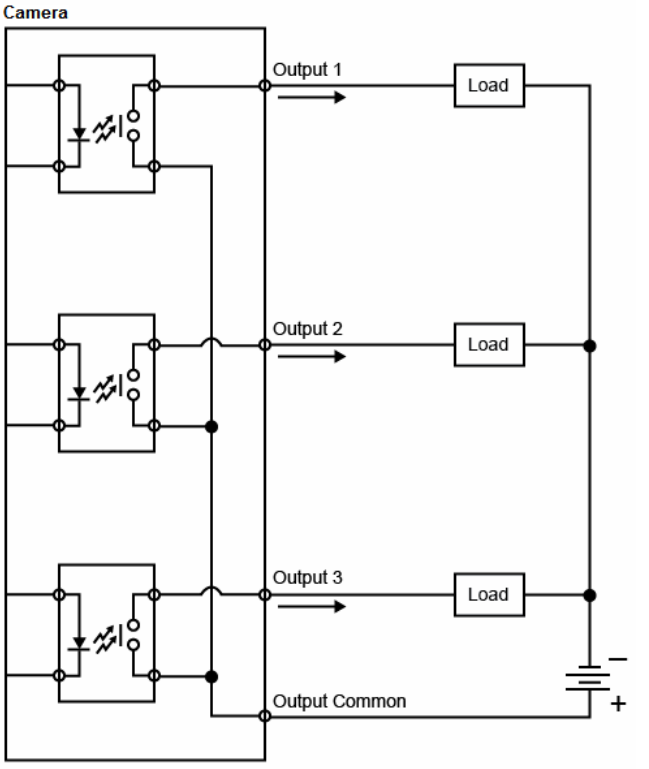
NPN Output for External Load



PNP Output for Host Input



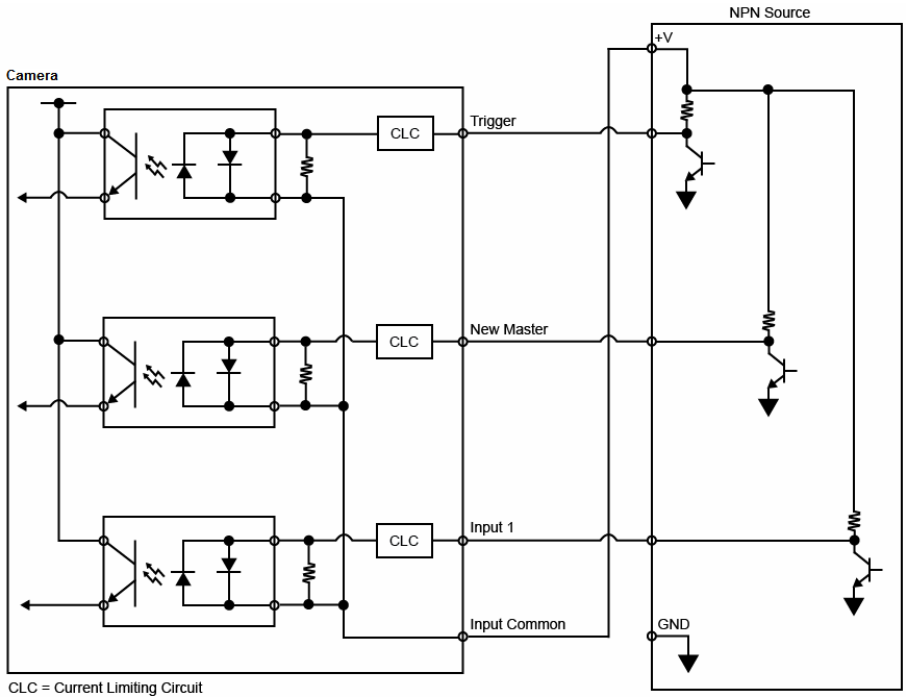
PNP Output for External Load



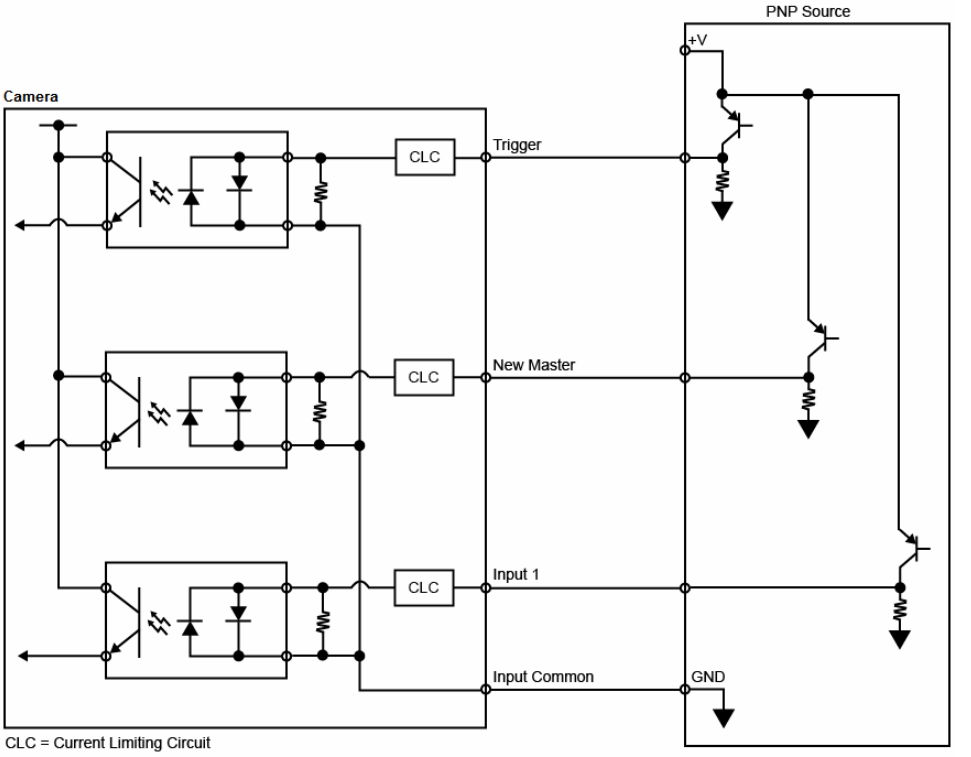
Optoisolated Inputs

All discrete inputs are optoisolated. Inputs can be configured as either NPN or PNP, but NPN and PNP cannot be mixed in a system, because the input common is shared by all inputs.

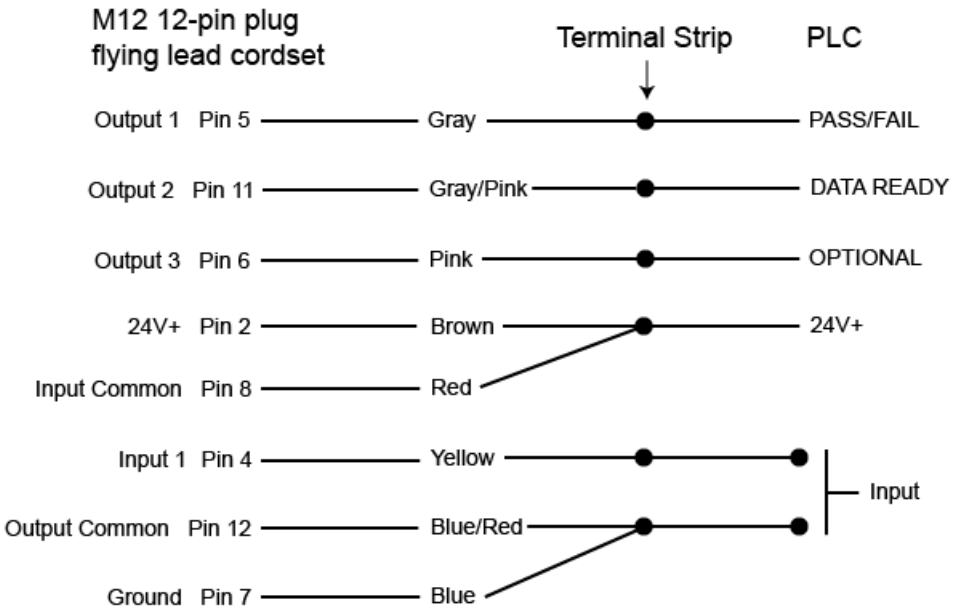
NPN



PNP


PNP Source
+V
Camera
CLC
Trigger
CLC
New Master
CLC
Input 1
Input Common
GND
CLC = Current Limiting Circuit

Input/Output Wiring



Power Requirements

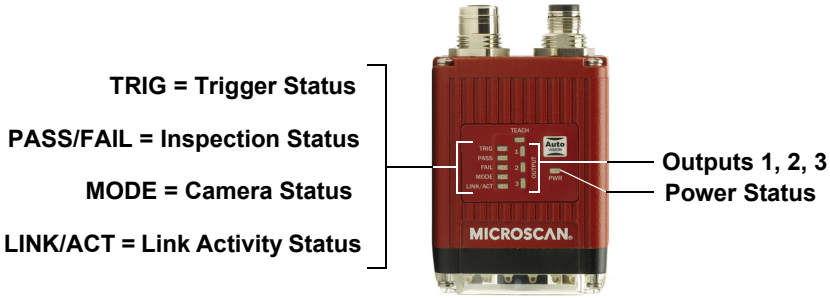
Refer to Table 2-3 when determining the power supply requirements for your camera.

TABLE 2–3. Camera Power Requirements

Component	
Vision HAWK Smart Camera, CCD	5-28VDC, 200mV p-p max ripple, 170mA at 24VDC (typ.) 15.5 watts (max.)
Vision HAWK Smart Camera, CMOS	5-28VDC, 200mV p-p max ripple, 135mA at 24VDC (typ.) 13 watts (max.)
Vision HAWK C-Mount Smart Camera, CCD	5-28VDC, 200mV p-p max ripple, 130mA at 24VDC (typ.) 15.5 watts (max.)
Vision HAWK C-Mount Smart Camera, CMOS	5-28VDC, 200mV p-p max ripple, 105mA at 24VDC (typ.) 13 watts (max.)

Status Indicators

The top of the Vision HAWK Smart Camera has multiple LEDs that indicate different trigger, inspection, camera, communication, and power states.



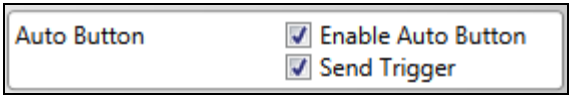
TRIG	**On Steady**	Continuous Trigger
	Off	Waiting for Trigger Event
	On Flashing	Trigger Event
PASS/FAIL	**On**	Active State
	Off	Inactive State
MODE	**On Steady**	Unit Ready
	Off	Unit Not Ready
LINK/ACT	**On Steady**	Link Established
	Off	No Link/Activity
	On Flashing	Link Established and Activity on Link
PWR	**On**	Power On
	Off	No Power Applied to Unit
OUTPUTS	**On**	Signal Sent to External Output
	Off	No Signal Sent to External Output

Additional User Feedback

- Green Flash – A green flash from the front of the unit indicates a Good Read.
- Red X Targeting Pattern – The red X targeting pattern from the front of the unit allows the user to center an object in the camera's field of view.
- Beeper – The beeper is an audible verification that either a Pass or a Fail has occurred.

AutoVISION Button

The AutoVISION Button has two positions, selectable by the length of time the button is held down, and indicated by one or two beeps in succession. It can also be used to send a trigger signal when **Send Trigger** is checked in AutoVISION software's **Connect** view. When the trigger functionality is enabled, pushing the AutoVISION Button triggers the camera to capture an image.



1st Position: Red Targeting Pattern

The first AutoVISION Button position turns the targeting system on. This overrides any other targeting modes that have been configured.

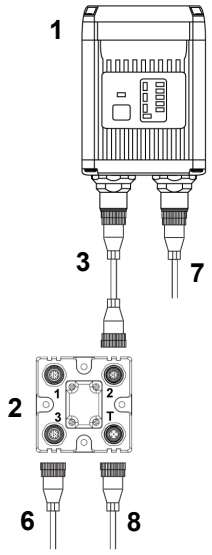
2nd Position: Auto Calibration

The second AutoVISION Button position starts the Auto Calibration process, which selects the appropriate photometry and focus settings for the camera. The selected values are then saved for power-on.

Setting Up a Job in AutoVISION

AutoVISION is a critical component of the Vision HAWK's functionality. Designed for use with the Vision HAWK, AutoVISION provides an intuitive interface, step-by-step configuration, and a library of presets that allow easy setup and deployment. For more complex vision applications, the system can be upgraded from AutoVISION to Visionscape.

1. Configure Vision HAWK hardware.



See Appendix A, **Connector Pinouts**, for Vision HAWK pin assignments.

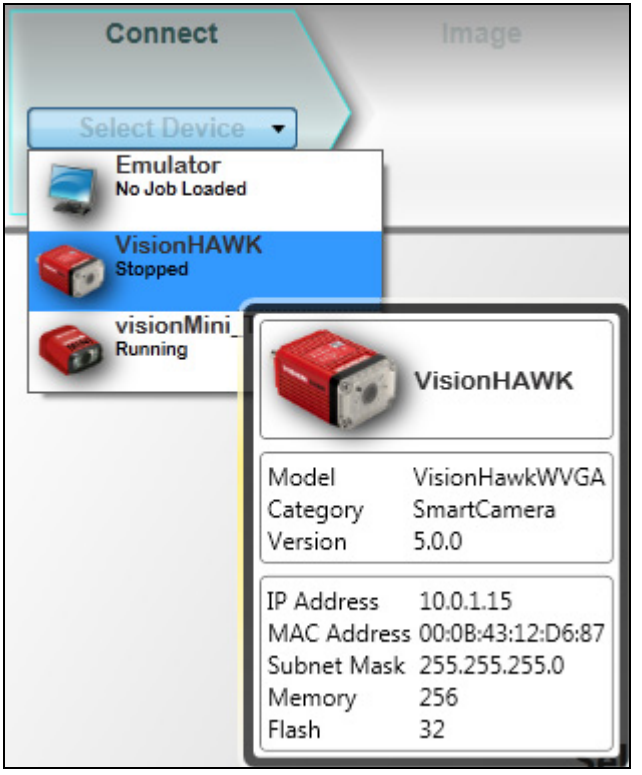
Item	*Description*	*Part Number*
1	Vision HAWK Smart Camera	GMV-6800-XXXXG
2	QX-1 Interface Device	98-000103-02
3	Cordset, Common, M12 12-pin Plug to M12 12-pin Socket, 1 m	61-000162-01
4	Cordset, Host, Serial, M12 12-pin Plug to DB9, 1 m	61-000152-01
5	Cordset, Host, Serial, M12 12-pin Socket to DB9, 1 m	61-000153-01
6	Power Supply, M12 12-pin Socket, 1.3 m	97-000003-01
7	Cordset, Host, Ethernet, M12 8-pin Plug to RJ45, 1 m	61-000160-01
8	Trigger, M12 4-pin Plug, NPN, Dark On, 2 m	99-000020-02

Note: Additional cables available in the Microscan Product Pricing Catalog.

- Mount the camera as required by the application.
- Connect the Ethernet cable from "B" on the camera to the network.
- Connect the power supply to "3" on the QX-1.
- Connect the photo sensor to "T" on the QX-1.
- Connect the "Common" cable to "2" on the QX-1 and "A" on the camera.
- Plug in the power supply.

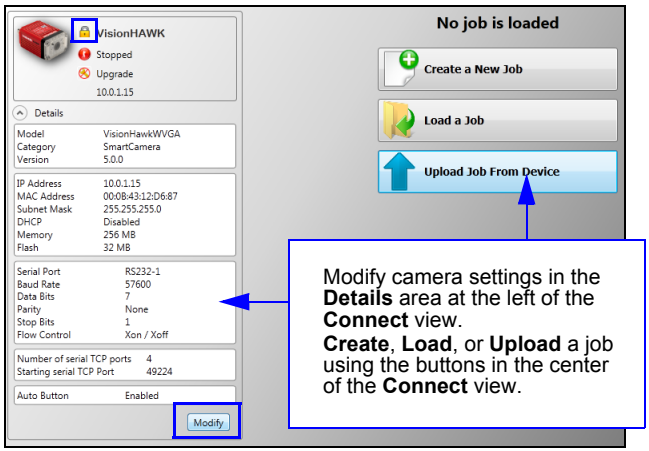
2. Select your Vision HAWK in the AutoVISION Connect view, create a job, and adjust camera settings.

   AutoVISION's **Connect** view allows you to select your device and configure its settings, and to create a new job. The **Select Device** dropdown menu provides a list of available devices. Hover the mouse over a device to see its details.



Click the lock icon to take control of the camera. When you have control of the camera, the **Modify** button will appear beneath the camera settings. Click the Modify button to adjust camera settings.

Note: The default IP address of the camera is: **192.168.0.10**. Be sure your PC is on the same subnet (**192.168.0.100**, for example).

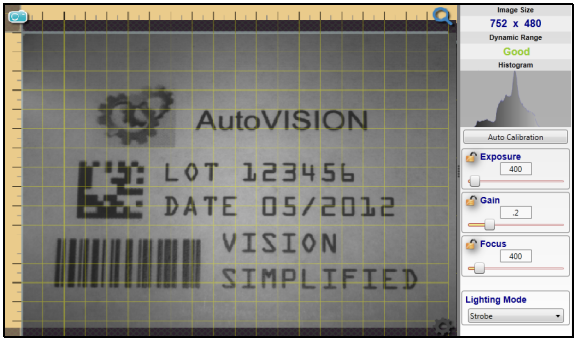


Important: When modifying camera settings, you will need to enter a username and password for the camera. The default username and password are:

– **Username:** Microscan

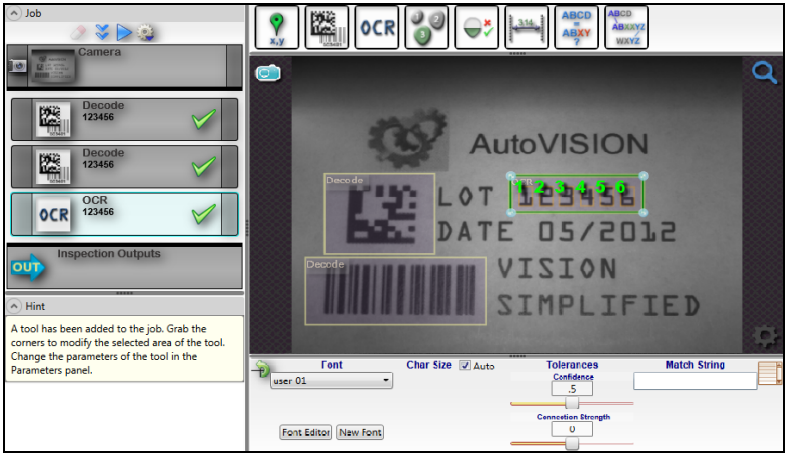
– **Password:** vision

Once you have selected your camera, adjusted its settings, and created a new job, you will move to the **Image** view. This view allows you to **Auto Calibrate** the camera, and to manually adjust the camera's Exposure, Gain, and Focus, and also to set the Lighting Mode (On, Off, or Strobe).



3. Edit the Job in AutoVISION.

   After you have created a new job, loaded a job from your PC, or uploaded a job from the camera, you will proceed to the Edit view to refine your machine vision job. The Camera parameters below the captured image allow you to set Gain, Exposure, Focus, Trigger, and Lighting. Inspection Outputs options allow you to connect your job to the outside world. This is also the view where you can add multiple tools to the job. The tool icons are located above the main view area.



4. Run the Job in AutoVISION.

   Going to the **Run** view will automatically download your job to the camera and start it running.

5. Save the Job.

   Click the **Save to Camera** icon on the File menu bar to save the job to the Vision HAWK.

3

CHAPTER 3 Optics and Lighting

This section describes the optical and illumination characteristics of the Vision HAWK Smart Camera.

Optics

The Vision HAWK Smart Camera is available with a built-in CMOS sensor or CCD sensor.

Optics Specifications

Part Number	GMV-6800-1100G	GMV-6800-1200G	GMV-6800-1300G	GMV-6800-1110G	GMV-6800-1210G	GMV-6800-1310G
Sensor	CCD, Global Shutter			CMOS, Global Shutter		
Sensor Color	Monochrome					
Resolution	SXGA (1280 x 960) CCD			WVGA (752 x 480) CMOS		
Focal Range	1” (33 mm) to ∞ (liquid lens autofocus)					
Shutter	Exposure: 33,333us to 6.6us			Exposure: 16,666us to 25us		
Part Number	**GMV-6800-1102G**	**GMV-6800-1202G**	**GMV-6800-1302G**	**GMV-6800-1112G**	**GMV-6800-1212G**	**GMV-6800-1312G**
Sensor	CCD, Global Shutter			CMOS, Global Shutter		
Sensor Color	Monochrome					
Resolution	SXGA (1280 x 960) CCD			WVGA (752 x 480) CMOS		
Focal Range	1” (33 mm) to ∞ (liquid lens autofocus)					
Shutter	Software-adjustable 1/30 to 1/100,000			Software-adjustable 1/60 to 1/100,000		

Part Number	GMV-6800-1000G	GMV-6800-1002G	GMV-6800-1010G	GMV-6800-1012G
Sensor	CCD, Global Shutter		CMOS, Global Shutter	
Sensor Color	Monochrome			
Resolution	SXGA (1280 x 960) CCD		WVGA (752 x 480) CMOS	
Focal Range	Depends on lens			
Shutter	Exposure: 33,333us to 6.6us		Exposure: 16,666us to 25us	

Illumination

The standard version of the Vision HAWK Smart Camera has built-in lighting (red LEDs for SXGA models and white LEDs for QXGA models). The LEDs can be configured to operate in multiple modes – Continuous, Strobe, and Off.

Lighting Specifications

Part Number	GMV-6800-1100G	GMV-6800-1200G	GMV-6800-1300G	GMV-6800-1110G	GMV-6800-1210G	GMV-6800-1310G
	GMV-6800-1102G	GMV-6800-1202G	GMV-6800-1302G	GMV-6800-1112G	GMV-6800-1212G	GMV-6800-1312G
LED Color	Red @ 617nm					

Important: The Vision HAWK C-Mount (GMV-6800-1000G, GMV-6800-1002G, GMV-6800-1010G, GMV-6800-1012G) does not have built-in lighting. The Machine Vision Lighting Principles on the following page provide some suggestions for how to determine the appropriate external lighting for your application.

Machine Vision Lighting Principles

Proper lighting is critical to the success of a machine vision application. Depending on the requirements of your application, you may also need to add external lighting from Microscan's NERLITE family of machine vision lighting products.

Consider the following when setting up your application:

– Is the surface of the object flat, slightly bumpy, or very bumpy?

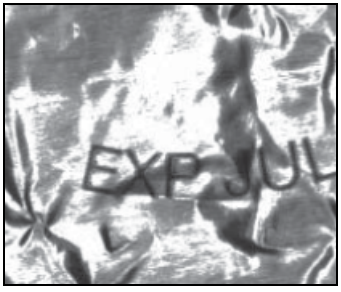
– Is the surface matte or shiny?

– Is the object curved or flat?

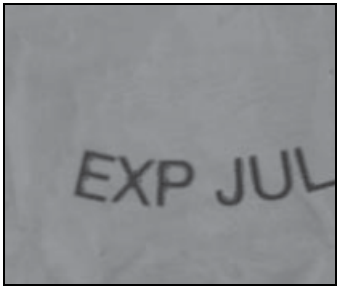
– What is the color of the object or area being inspected?

– Is the object moving or stationary?

Machine vision lighting should maximize contrast of the areas or features being inspected while minimizing the contrast of everything else.



Before correct lighting

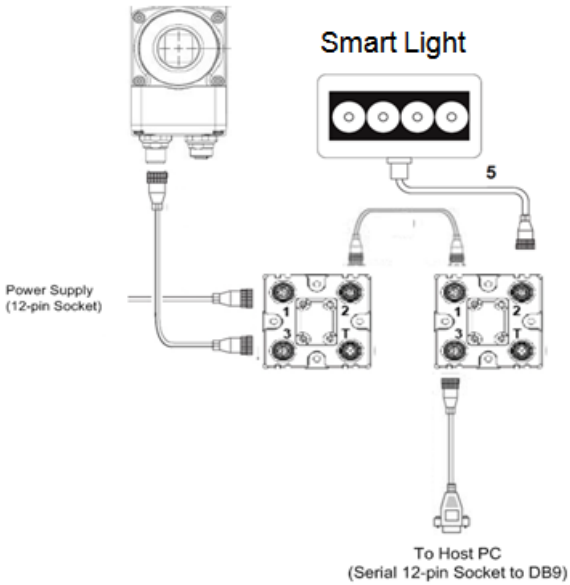


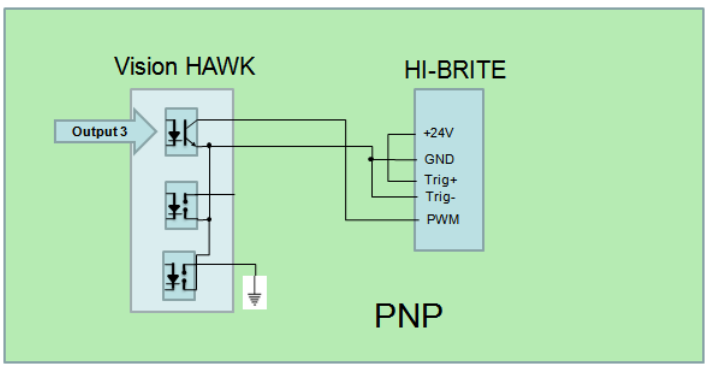
After correct lighting with a NERLITE CDI Illuminator

External Illumination Control

The Vision HAWK C-Mount Smart Camera supports external lighting with Microscan's NERLITE Smart Series lights. The diagram below demonstrates how the camera and light can be configured with two QX-1 interface devices. The light is controlled using the **Lighting** control in the **Camera** configuration settings of AutoVISION software.

The camera's trigger is synchronized with the light to create a strobe effect for reliable image acquisition.





A

APPENDIX A Connector Pinouts

This section contains information about Vision HAWK Smart Camera connectors:

Vision HAWK Smart Camera Connectors

Connector A – M12 12-Pin Plug – Power, I/O, and Serial

Figure A–1 shows the M12 12-pin plug at connector A.

FIGURE A–1. Connector A – M12 12-Pin Plug

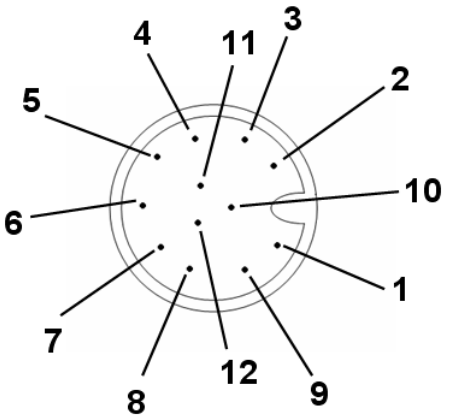


Table A–1 describes the M12 12-pin plug signals.

TABLE A–1. Connector A – M12 12-Pin Plug

Pin	Function
1	Trigger
2	Power
3	Default
4	Input 1
5	Output 1
6	Output 3
7	Ground
8	Input Common
9	Host RxD
10	Host TxD
11	Output 2
12	Output Common

Connector B – M12 8-Pin Socket – Ethernet

Figure A-2 shows the M12 8-pin socket at connector B.

FIGURE A–2. Connector B – M12 8-Pin Socket

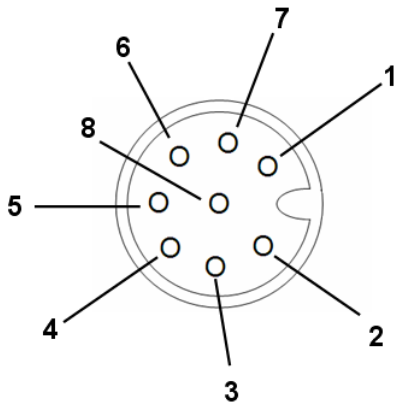


Table A-2 describes the M12 8-pin socket signals.

TABLE A–2. Connector B – M12 8-Pin Socket

Pin	Function
1	Terminated
2	Terminated
3	Terminated
4	TX (–)
5	RX (+)
6	TX (+)
7	Terminated
8	RX (–)

Appendix A Connector Pinouts

APPENDIX B Cable Specifications

This section contains information about Vision HAWK Smart Camera cables.

Note: Cable specifications are published for information only. Microscan does not guarantee the performance or quality of cables provided by other suppliers.

TABLE B–1. Cable Part Numbers and Descriptions

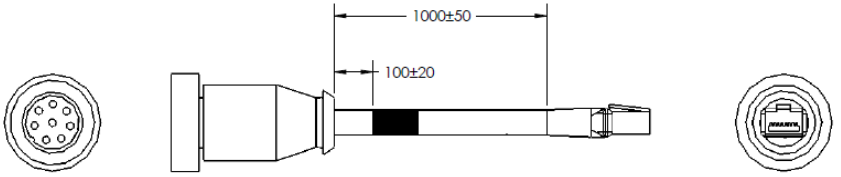
Part Number	Descriptions
61-000160-01	Cable, Host, Ethernet, M12 8-pin Plug to RJ45, 1 m
61-000162-01	Cable, Common, M12 12-pin Plug to M12 12-pin Socket, 1 m
97-000003-01	Power Supply, M12 12-pin Socket, 1.3 m
99-000020-02	Trigger, M12 4-pin Plug, NPN, Dark On, 2 m

61-000160-01 Cable, Host, Ethernet, M12 8-pin Plug to RJ45, 1 m

The 61-000160-01 Cable, Host, Ethernet, M12 8-pin Plug to RJ45, 1 m is a 1 meter cable with an 8-pin M12 Ultra-Lock connector on one end and a standard RJ45 connector on the other end.

Figure B-1 shows the 61-000160-01 Cable, Host, Ethernet, M12 8-pin Plug to RJ45, 1 m.

FIGURE B–1. Cable, Host, Ethernet, M12 8-pin Plug to RJ45, 1 m



Important: Be sure that the retaining clip on the RJ45 connector has locked into place in the Ethernet receptacle on the PC and is not being impeded by the rubber housing.

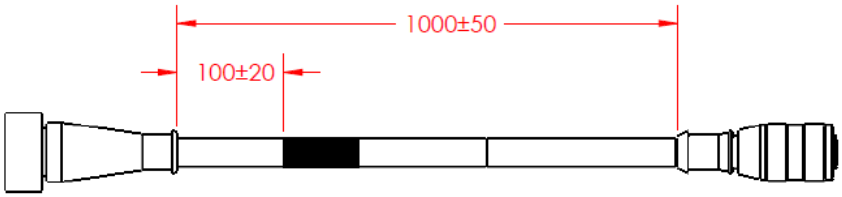
Note: A screw-down version of this cable is also available (61-000160-02).

61-000162-01 Cable, Common, M12 12-pin Plug to M12 12-pin Socket, 1 m

The 61-000162-01 Cable, Common, M12 12-pin Plug to M12 12-pin Socket, 1 m is a 1 meter cable with a 12-pin M12 plug on one end and a 12-pin M12 socket on the other end.

Figure B-2 shows the 61-000162-01 Cable, Common, M12 12-pin Plug to M12 12-pin Socket, 1 m.

FIGURE B–2. Cable, Common, M12 12-pin Plug to M12 12-pin Socket, 1 m



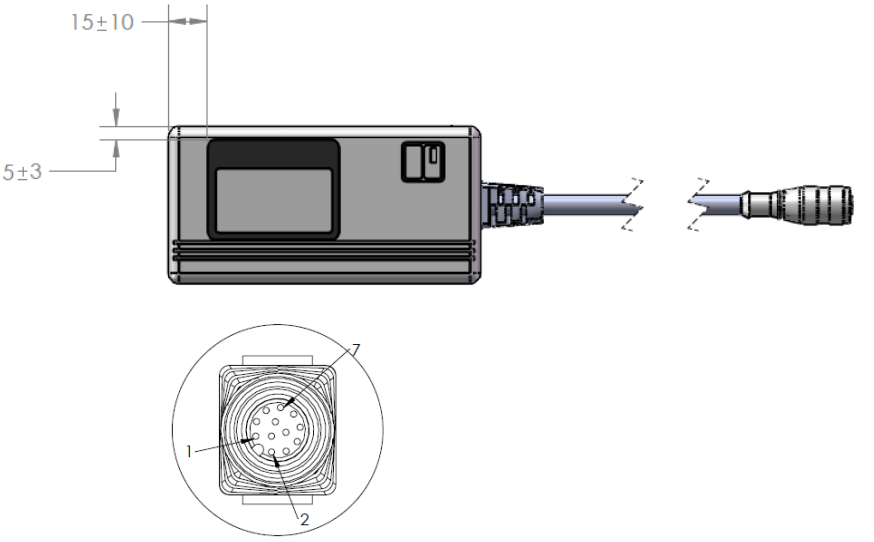
Note: A screw-down version of this cable is also available (61-000162-02).

97-000003-01 Power Supply, M12 12-pin Socket, 1.3 m

The 97-000003-01 Power Supply, M12 12-pin Socket, 1.3 m is a 90-254 VAC, +24VDC power supply.

Figure B-3 shows the 97-000003-01 Power Supply, M12 12-pin Socket, 1.3 m.

FIGURE B–3. Power Supply, M12 12-pin Socket, 1.3 m



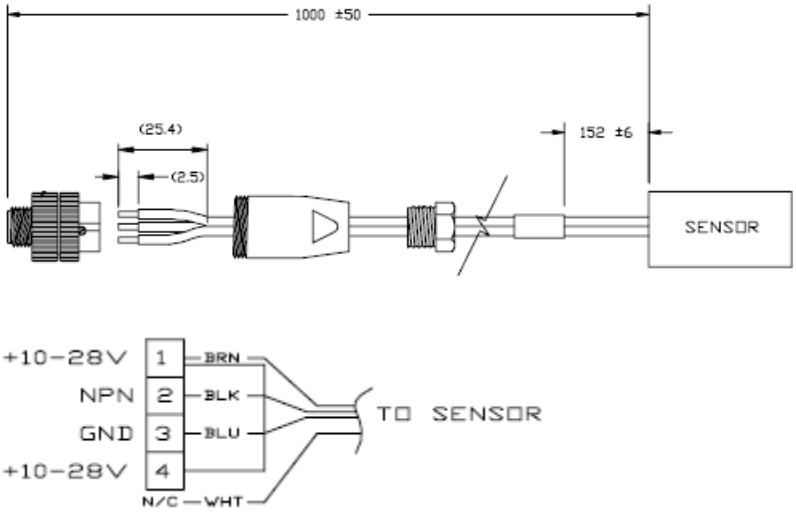
M12 12-Pin Socket

99-000020-02 Trigger, M12 4-pin Plug, NPN, Dark On, 2 m

The 99-000020-02 Trigger, M12 4-pin Plug, NPN, Dark On, 2 m is a photo sensor with a 4-pin M12 connector.

Figure B-4 shows the 99-000020-02 Trigger, M12 4-pin Plug, NPN, Dark On, 2 m.

FIGURE B–4. Trigger, M12 4-pin Plug, NPN, Dark On, 2 m



99-000020-02 Schematic

APPENDIX C General Specifications

This section contains specifications and dimensions for the Vision HAWK Smart Camera and Vision HAWK C-Mount Smart Camera.

TABLE C–1. General Specifications

Part Number	GMV-6800-1100G	GMV-6800-1200G	GMV-6800-1300G	GMV-6800-1110G	GMV-6800-1210G	GMV-6800-1310G
Sensor	SXGA (1280 x 960) CCD			WVGA (752 x 480) CMOS		
Sensor Color	Monochrome					
Height	1.59” (40.5 mm)					
Width	2.27” (57.6 mm)					
Depth	3.79” (96.3 mm)					
Weight	10 oz. (280 g)					
Power	5-28VDC, 200mV p-p max ripple, 170mA at 24VDC (typ.), 15.5 watts (max.)			5-28VDC, 200mV p-p max ripple, 135mA at 24VDC (typ.), 13 watts (max.)		
Connector	M12 12-pin Ultra-Lock (Connector A) and M12 8-pin Ultra-Lock (Connector B)					
Lens Type	Built-In Liquid Lens					
Communications	RS-232 or Ethernet					
Illumination	**High Output LEDs:** .564mW, 470, 525, 617nm					
Laser Output	5.0mW max.; **Type:** Laser diode; **Output Wavelength:** 655nm nominal; **Operating Life:** 50,000 hours @ 25° C; **Safety Class:** Class 1 Visible Laser					
Indicators	**LEDs:** Trigger, Pass, Fail, Mode, Power, Network Activity, I/O; **Green Flash:** Pass; **Red X:** Target					
I/O	**Learn/Trigger:** Bi-directional, optoisolated, 4.5–28V rated, (13mA at 24VDC); **Outputs (1, 2, 3):** Bi-directional, optoisolated, 1–28V rated, (I_{CE} <100mA at 24VDC, current limited by user)					

TABLE C–1. General Specifications (Continued)

Image Acquisition	Progressive scan, square pixel	
Focal Range	1” (33 mm) to ∞ (liquid lens autofocus)	
Shutter	Software-adjustable 1/30 to 1/100,000	Software-adjustable 1/60 to 1/100,000
Operating Temperature	0° to 45° C (32° to 118° F)	0° to 50° C (32° to 122° F)
Storage Temperature	–29° to 70° C (–20° to 158° F)	
Humidity	Up to 90% (non-condensing)	
Compliance	**CDRH**, **FCC**, **UL/cUL**, **CE (General Immunity for Light Industry:** EN 55024:1998 ITE Immunity Standard; **Radiated and Conducted Emissions of ITE Equipment:** EN 55022:98 ITE Disturbances**)**, **CB**, **BSMI**	

TABLE C–1. Specifications (Continued)

Part Number	GMV-6800-1102G	GMV-6800-1202G	GMV-6800-1302G	GMV-6800-1112G	GMV-6800-1212G	GMV-6800-1312G
Sensor	SXGA (1280 x 960) CCD			WVGA (752 x 480) CMOS		
Sensor Color	Monochrome					
Height	1.59” (40.5 mm)					
Width	2.27” (57.6 mm)					
Depth	3.79” (96.3 mm)					
Weight	10 oz. (280 g)					
Power	5-28VDC, 200mV p-p max ripple, 170mA at 24VDC (typ.), 15.5 watts (max.)			5-28VDC, 200mV p-p max ripple, 135mA at 24VDC (typ.), 13 watts (max.)		
Connector	M12 12-pin Ultra-Lock (Connector A) and M12 8-pin Ultra-Lock (Connector B)					
Lens Type	Fixed Lens					
Communications	RS-232 or Ethernet					
Illumination	**High Output LEDs:** .564mW, 470, 525, 617nm					
Laser Output	5.0mW max.; **Type:** Laser diode; **Output Wavelength:** 655nm nominal; **Operating Life:** 50,000 hours @ 25° C; **Safety Class:** Class 1 Visible Laser					
Indicators	**LEDs:** Trigger, Pass, Fail, Mode, Power, Network Activity, I/O; **Green Flash:** Pass; **Red X:** Target					
I/O	**Learn/Trigger:** Bi-directional, optoisolated, 4.5–28V rated, (13mA at 24VDC); **Outputs (1, 2, 3):** Bi-directional, optoisolated, 1–28V rated, (I_{CE} <100mA at 24VDC, current limited by user)					
Image Acquisition	Progressive scan, square pixel					
Focal Range	1” (33 mm) to ∞ (liquid lens autofocus)					
Shutter	Software-adjustable 1/30 to 1/100,000			Software-adjustable 1/60 to 1/100,000		
Operating Temperature	0° to 45° C (32° to 118° F)			0° to 50° C (32° to 122° F)		
Storage Temperature	–29° to 70° C (–20° to 158° F)					
Humidity	Up to 90% (non-condensing)					
Compliance	**CDRH**, **FCC**, **UL/cUL**, **CE (General Immunity for Light Industry:** EN 55024:1998 ITE Immunity Standard; **Radiated and Conducted Emissions of ITE Equipment:** EN 55022:98 ITE Disturbances**)**, **CB**, **BSMI**					

TABLE C–1. Specifications (Continued)

Part Number	GMV-6800-1000G	GMV-6800-1002G	GMV-6800-1010G	GMV-6800-1012G
Sensor	SXGA (1280 x 960) CCD		WVGA (752 x 480) CMOS	
Sensor Color	Monochrome			
Height	4.03” (102.3 mm)			
Width	2.27” (57.6 mm)			
Depth	1.59” (40.5 mm)			
Weight	11 oz. (320 g)			
Power	5-28VDC, 200mV p-p max ripple, 130mA at 24VDC (typ.), 15.5 watts (max.)		5-28VDC, 200mV p-p max ripple, 105mA at 24VDC (typ.), 13 watts (max.)	
Connector	M12 12-pin Ultra-Lock (Connector A) and M12 8-pin Ultra-Lock (Connector B)			
Lens Type	C-Mount Lens			
Communications	RS-232 or Ethernet			
Illumination	External Illumination Required			
Laser Output	N/A			
Indicators	**LEDs:** Trigger, Pass, Fail, Mode, Power, Network Activity, I/O			
I/O	**Learn/Trigger:** Bi-directional, optoisolated, 4.5–28V rated, (13mA at 24VDC); **Outputs (1, 2, 3):** Bi-directional, optoisolated, 1–28V rated, (I_{CE} <100mA at 24VDC, current limited by user)			
Image Acquisition	Progressive scan, square pixel			
Focal Range	Depends on lens			
Shutter	Software-adjustable 1/30 to 1/100,000		Software-adjustable 1/60 to 1/100,000	
Operating Temperature	0° to 45° C (32° to 118° F)		0° to 50° C (32° to 122° F)	
Storage Temperature	–29° to 70° C (–20° to 158° F)			
Humidity	Up to 90% (non-condensing)			
Compliance	**CDRH**, **FCC**, **UL/cUL**, **CE (General Immunity for Light Industry:** EN 55024:1998 ITE Immunity Standard; **Radiated and Conducted Emissions of ITE Equipment:** EN 55022:98 ITE Disturbances**)**, **CB**, **BSMI**			

Dimensions

FIGURE C–1. Vision HAWK Smart Camera Dimensions

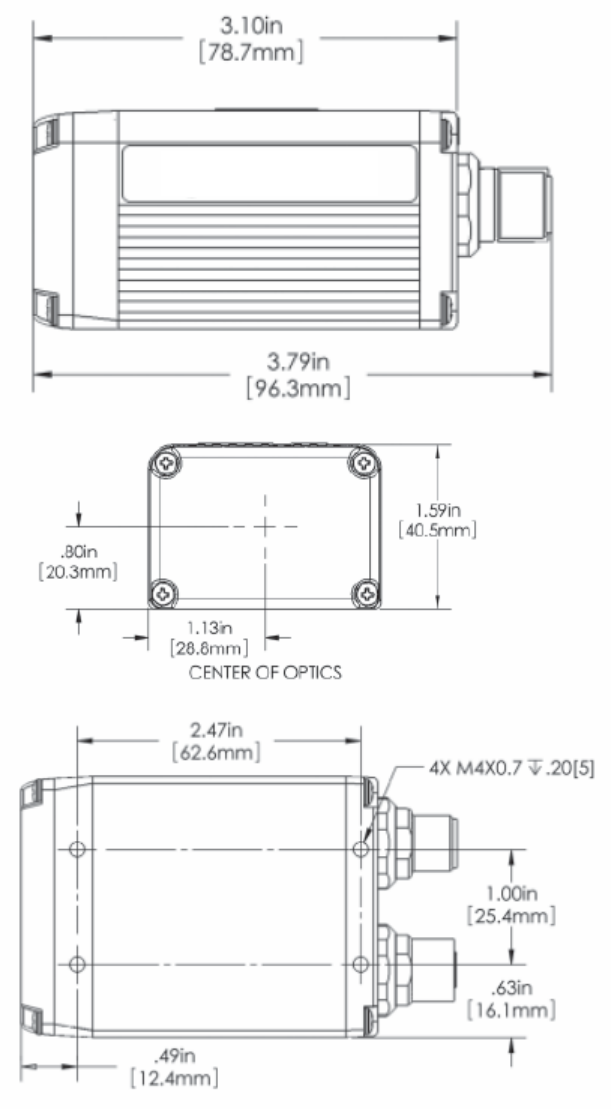
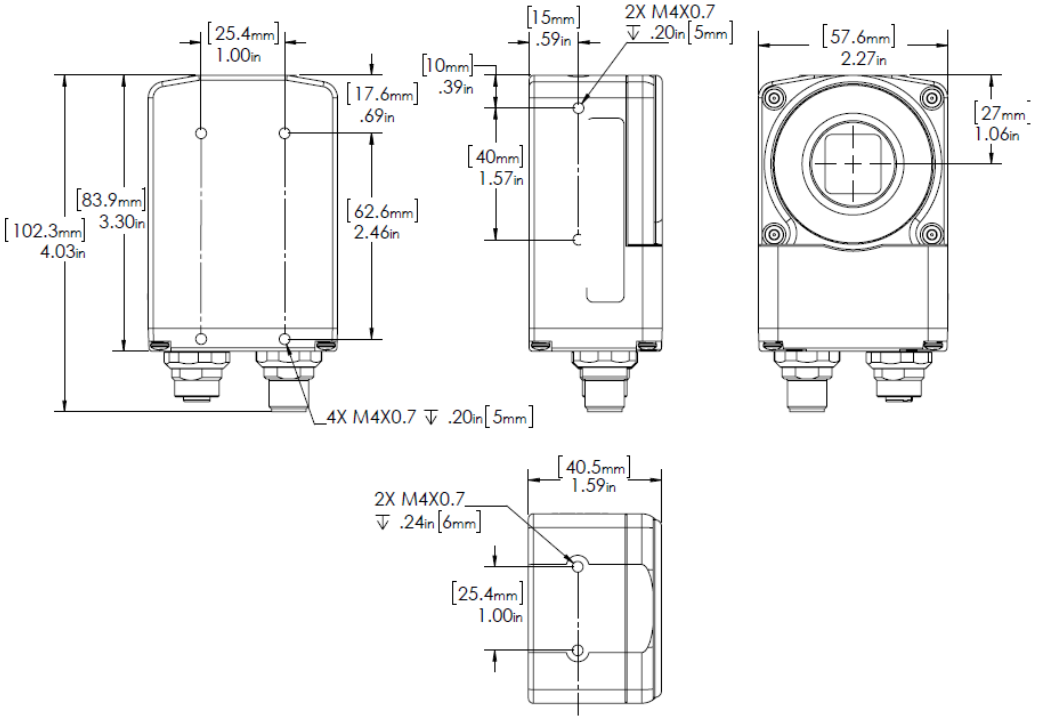


FIGURE C–2. Vision HAWK C-Mount Smart Camera Dimensions



Field of View and Working Distance