OMRON
MICROSCAN

MicroHAWK MV-20 / MV-30 / MV-40
Smart Camera Guide

Disclaimer

The information and specifications described in this manual are subject to change without notice.

Latest Manual Version

For the latest version of this manual, see the Download Center on our web site at: **www.microscan.com**.

Technical Support

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Warranty

For current warranty information, see: **www.microscan.com/warranty**.

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Statements of Compliance

CE Class A

MicroHAWK Smart Cameras have passed Class A testing for the standards listed below, including U.S. (FCC), European (EN), and Canadian EMC requirements (ICES).

- 2011/65/EU
- EN 50581:2012

- 2004/108/EC
- EN 55022:2010 For Class A Products
- EN 55024:2010, including:
    - IEC 61000-4-3:2010
    - IEC 61000-4-4:2012
    - IEC 61000-4-5:2014
    - IEC 61000-4-6:2013
    - IEC 61000-4-8:2009
    - IEC 61000-4-11:2004
- EN 61000-3-2:2014
- EN 61000-3-3:2013

- FCC 15.109:2015 For Class A Products
- FCC 15.107:2015 For Class A Products
- ICES-003:2012 For Class A Products

CE Class B

MicroHAWK Smart Cameras have passed Class B testing for the standards listed below, including U.S. (FCC), European (EN), and Canadian EMC requirements (ICES). The MicroHAWK had a ferrite core installed on the USB cable adjacent to the MV-20 for all tests. The ferrite used was classified as a lower and broadband part for frequencies in the range of 1-300 MHz.

- 2011/65/EU
- EN 50581:2012

- 2004/108/EC
- EN 55022:2010 For Class B Products
- EN 55024:2010, including:
    - IEC 61000-4-3:2010
    - IEC 61000-4-4:2012
    - IEC 61000-4-5:2014
    - IEC 61000-4-6:2013
    - IEC 61000-4-8:2009
    - IEC 61000-4-11:2004
- EN 61000-3-2:2014
- EN 61000-3-3:2013

- FCC 15.109:2015 For Class B Products
- FCC 15.107:2015 For Class B Products
- ICES-003:2012 For Class B Products

EMC

ESD

Electromagnetic compatibility (EMC) exception: The MicroHAWK was tested for electrostatic discharge immunity per IEC 61000-4-2. The following conditions and exclusions apply for proper use of the MicroHAWK and for ESD immunity as it applies to the overall system in which the MicroHAWK is integrated. The MicroHAWK is not intended for stand-alone functionality and is meant to function as part of a larger system. Per paragraph 8.3.2 of IEC 61000-4-2, sections A and C:

A.) Points and surfaces that are only accessible by maintenance.

Justification: The MicroHAWK is approved for use when installed as a component and when it is no longer accessible to the end user except at the time of installation or when maintenance is performed. The MicroHAWK may be accessed for maintenance provided that proper ESD handling procedures are followed.

C.) Points or surfaces of equipment that are no longer accessible after fixed installation.

Justification: The MicroHAWK is installed as a component in a system and the device is no longer accessible.

The end user should be trained in ESD safety and handling. The system in which the MicroHAWK is installed should be properly grounded for power ground and earth ground. The MicroHAWK should not be placed next to devices that build up excessive static charge.

Statements of Compliance

FCC

MicroHAWK MV-20, MV-30, and MV-40 Smart Cameras have been tested for compliance with FCC (Federal Communications Commission) requirements and have been found to conform to applicable FCC standards.

To comply with FCC RF exposure compliance requirements, this device must not be co-located with or operate in conjunction with any other antenna or transmitter.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

CE

MicroHAWK MV-20, MV-30, and MV-40 Smart Cameras have been tested for compliance with CE (Conformité Européenne) requirements, and have been found to conform to applicable CE standards.

The CE Declaration of Conformity for this product is available from Omron Microscan upon request.

MicroHAWK MV-20, MV-30, and MV-40 Smart Cameras have been tested by an independent electromagnetic compatibility laboratory in accordance with the applicable specifications and instructions.
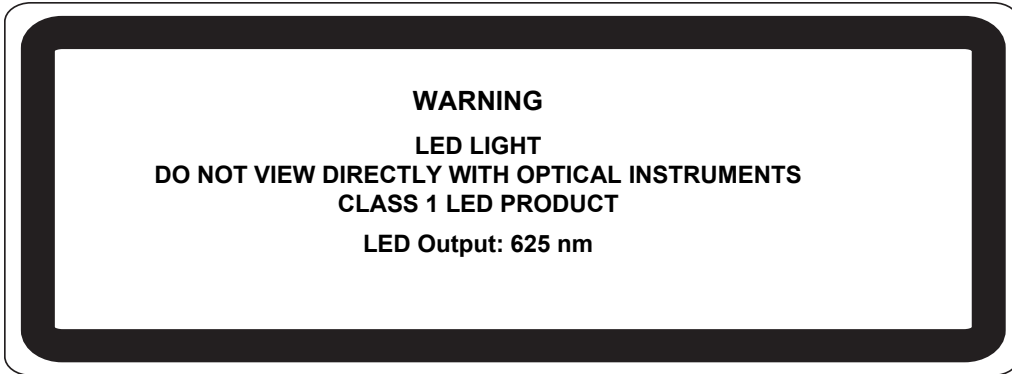
UL

MicroHAWK MV-20, MV-30, and MV-40 Smart Cameras have been tested for compliance with UL (Underwriters Laboratories) standards and guidelines, and have been found to conform to applicable UL standards.

Restricted Substances

See **www.microscan.com/quality** for Omron Microscan compliance statements related to all applicable restricted substances.

Warning and Caution Summary

WARNING

LED LIGHT
DO NOT VIEW DIRECTLY WITH OPTICAL INSTRUMENTS
CLASS 1 LED PRODUCT

LED Output: 625 nm

CAUTION: Viewing the MicroHAWK MV-20, MV-30, or MV-40 Smart Camera's LED output with optical instruments such as magnifiers, eye loupes, or microscopes within a distance of 100 mm could cause serious eye injury.

CAUTION: Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

Contents

Welcome

Purpose of This Manual

This manual contains detailed information about how to configure and operate MicroHAWK MV-20, MV-30, and MV-40 Smart Cameras.

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

1

Introduction

MicroHAWK MV-20, MV-30, and MV-40 Smart Cameras

Product Summary

MicroHAWK MV-20, MV-30, and MV-40 Smart Cameras are designed for reliable vision performance in embedded identification and inspection applications. As the world's smallest fully-integrated vision system, the MicroHAWK's compact size and wide angle optics provide the best performance available for machine vision tasks at close range.

The MicroHAWK MV-20, MV-30, and MV-40 allow OEM design engineers to implement inspection, color matching, symbol decoding, OCR, and more, in a single compact solution. The camera's small form factor allows flexible positioning in tight spaces.

AutoVISION software, designed for use with the MicroHAWK MV-20, MV-30, and MV-40, 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

- World's smallest fully functional vision system

- Virtual Ethernet over USB (MicroHAWK Engine, MV-20 and MV-30)

- OEM-ready for easy integration

- Integrated lighting and flexible M12 fixed optics

- Flexible programming options for custom applications

- Simplified configuration with AutoVISION software

Applications

- Inspection

- Guidance

- Gauging

- Part presence/absence

- Color detection and matching

- Medical device inspection

- Fiducial location

- Part location/orientation detection

- Packaging

- Robotics

- Auto ID (Data Matrix and other 2D symbologies, 1D, OCR)

- 1D and 2D Code Verification

- OCV (Optical Character Verification)

Package Contents

Before you install AutoVISION software and connect your MicroHAWK MV-20, MV-30, or MV-40, please take a moment to confirm that the following items are available:

- A MicroHAWK MV-20, MV-30, or MV-40 Smart Camera.

- An active internet connection to download the latest AutoVISION software installer from the Download Center on the Omron Microscan website or a USB drive containing the latest AutoVISION software installer.

- A Micro-USB Type B-to-USB Type A cable (not included).

MicroHAWK MV-20, MV-30, and MV-40 Smart Camera Models

MV-20: OEM Smart Camera

The world's smallest full-featured and fully-integrated smart camera, the MicroHAWK MV-20 offers OEM integrators and engineers a perfect set of value and performance options in a tiny, simple, enclosed solution for embedded traceability and inspection designs. The MV-20 offers a single-cable solution that uses USB for both communication (USB 2.0 High Speed and Ethernet over USB) and power to enable plug-and-play integration.

• IP40 • USB 2.0 High Speed • Ethernet over USB • 24 x 34 x 39 mm

MV-30: Miniature Serial / USB Smart Camera

A micro-sized smart camera with huge potential, the MV-30 furthers Omron Microscan's 30+-year legacy of innovative, space-efficient, miniature design with a corner-exit cable and high-density 15-pin connector (offering serial, USB 2.0 High Speed, and Ethernet over USB capabilities) as well as optional liquid lens autofocus. Perfect for OEMs and machine builders, the MV-30 offers the perfect combination of size, performance, and flexible integration.

• IP54 • Serial RS-232 • USB 2.0 • Ethernet over USB • Autofocus • Corner-Exit Cable

MV–40: Industrial Ethernet Smart Camera

The MV-40 redefines the imaging market as the smallest IP65/IP67-rated, true-industrial Ethernet smart camera. With the library of Omron Microscan's machine vision tools on board in a rugged, ultra-compact case, the MV-40 is the complete package for solving any vision inspection challenge under any condition. Combining unprecedented ease of use, high-speed communication, optional liquid lens autofocus, and ultra-small form factor, the MV-40 is the ultimate compact machine vision system in the industry.

• IP65 • EtherNet/IP • Ethernet TCP/IP • PROFINET • Autofocus • Power over Ethernet (PoE)

Software Options

AutoVISION Software provides a simple setup and runtime interface for solving basic to mid-range vision and auto ID challenges. Scalable with Visionscape Software.

Visionscape Software provides a professional setup and runtime interface with access to Omron Microscan's full auto ID, verification, and machine vision tools.

MicroHAWK Feature Comparison

Features	*MV-20*	*MV-30*	*MV-40*
Barcode Reading (1D/2D)	•	•	•
Complete Machine Vision	•	•	•
Enclosure	IP40	IP54	IP65/67
PROFINET			•
Ethernet TCP/IP, EtherNet/IP			•
Ethernet over USB	•	•	
Serial (RS-232)		•	•
USB 2.0 High Speed / HID	•	•	
Power over Ethernet (PoE)			•
Outer Illumination		•	•
Liquid Lens Autofocus		•	•
Color Sensor	•	•	•
AutoVISION Sensor Software	•	•	•
AutoVISION Software	•	•	•
Visionscape Software	•	•	•

MicroHAWK MV Part Number Structure

MicroHAWK MV part numbers follow the format **7ABX-YZZZ-LPPP**.

7 = MicroHAWK.

Example Part Number: 7412-3000-2104

Description: MicroHAWK MV-40, IP65 Case, 24V, Ethernet, Machine Vision, SXGA, 1.2 Megapixel, Mono, Ultra-High Density, Autofocus, White Outer LEDs, AutoVISION + Verification + Visionscape.

(A) Model
1: Engine, No Case, USB
2: MV-20, IP40 Case, USB
3: MV-30, IP54 Case, 5V, USB
4: MV-40, IP65 Case, 24V, Ethernet

(B) Application Type
1: Machine Vision

(X) Sensor
1: WVGA 0.3 Megapixel, Mono
2: SXGA, 1.2 Megapixel, Mono
3: QSXGA, 5 Megapixel, Color

(Y) Optics
0: Custom
1: Standard-Density
2: High-Density
3: Ultra-High-Density
4: Long-Range (Autofocus Long Range available for SXGA sensor only.)
5: Ultra-High-Density with Polarizer

(ZZZ) Focus Distance
000: Autofocus
050: 50 mm = 1.96 in.
064: 64 mm = 2.51 in. – UHD FF
081: 81 mm = 3.18 in.
102: 102 mm = 4.02 in.
133: 133 mm = 5.23 in.
190: 190 mm = 7.48 in.
300: 300 mm = 11.81 in.
400: 400 mm = 15.75 in. – UHD FF

(L) Outer LED Color
0: N/A (Engine and ID-20)
1: Red (Not available with QSXGA sensor.)
2: White
3: Blue
4: IR

(PPP) Software
100: AutoVISION Sensor
101: AutoVISION
102: AutoVISION + Visionscape
103: AutoVISION + Verification
104: AutoVISION + Verification + Visionscape

Notes:
- **(A) Model:** The MicroHAWK Engine is available for OEM-certified partners only.
- **(L) Outer LED Color:** Outer LEDs provide extra illumination. Base-level LED illumination included with all cameras.
- **Field Upgrades:** Not available for optics or illumination due to factory settings for optical alignment, LED balancing, and sealing for IP enclosure rating. However, the camera's software is field-upgradeable via licenses.

2

System Components

This section contains specific information about system components as well as information to help you connect your MicroHAWK MV-20, MV-30, or MV-40 Smart Camera.

Note: There are no user-serviceable parts inside the camera.

# Hardware Components and Accessories

The table below lists MicroHAWK Smart Camera hardware components and the table on the next page lists the accessories. The reference numbers shown on configuration drawings later in this section refer to these tables.

Item	Part Number	Description
1	7ABX-YZZZ-LPPP	MicroHAWK MV-20, MicroHAWK MV-30, or MicroHAWK MV-40
2	61-9000034-01	Cable, USB A to Micro B, 6 ft., MV-20
3	61-9000045-01	Cable, USB A to Micro B, 3 ft., MV-20
4	61-9000043-01	Cable, DB15 to BUS Power USB Type A, MV-30
5	98-9000048-01	Kit, Cable, DB15 to Ext. Power/RS-232 with Power Supply, MV-30 – includes 97-9000006-01 and 61-9000037-01
6	97-9000006-01	Power Supply, 5V – for use with cables 61-9000037-01 and 61-9000038-01
7	61-9000037-01	Cable, DB15 to Ext. Power/RS-232, MV-30
8	98-9000049-01	Kit, Cable, DB15 to Ext. Power/USB with Power Supply, MV-30 – includes 97-9000006-01 and 61-9000038-01
9	61-9000038-01	Cable, DB15 to Ext. Power/USB, MV-30
10	98-9000050-01	Kit, Cable, DB15 to Ext. Power/USB, I/O with Power Supply, MV-30 – includes 97-000011-02 and 61-9000039-01
11	97-000011-02	Power Supply, 100-240VAC, +5VDC, 2-Pin U.S./Euro Plug
12	61-9000039-01	Cable, DB15 to Ext. Power/USB, I/O, MV-30
13	97-000012-02	Power Supply, 100-240VAC, +24VDC, TRK 3-Pin, U.S./Euro Plug
14	99-000018-01	IB-131 Interface Box
15	FIS-0001-0035G	Converter, IC-332, 24V/5V, Opto I/O – for use with IB-131
16	61-3000026-03	Cable, Communication, DB25 Plug to DB9 Socket, 6 ft.
17	99-000019-01	Photo Sensor, Visible, NPN, Light On, 5VDC
18	61-9000102-01	Cable, DB15 to USB/RS-232, Triggered, MV-30
19	97-000012-01	Power Supply, 100-240VAC, +24VDC, M12 12-Pin Socket
20	98-000103-02	QX-1 Interface Device
21	61-000162-02	Cordset, Common, M12 12-Pin Socket (Screw-On) to M12 12-Pin Plug
22	61-000160-03	Cordset, Host, Ethernet, M12 8-Pin Plug (Screw-On) to RJ45, 1 m.
23	99-000020-01	Photo Sensor, M12 4-Pin Plug, NPN, Dark Off, 2 m.
24	99-9000016-01	Photo Sensor, M12 4-Pin Plug, NPN, Dark On, 2 m.
25	61-9000054-01	Cable, M12 12-Pin Socket to 9-Pin Socket and M12 Plug
26	61-9000088-01	Cable, M12 12-Pin Socket to USB Keyboard Wedge and M12 Plug
	Upgrade to Visionscape	
	98-000217-01	Upgrade from AutoVISION to full Visionscape functionality
	Mounting Options	
	98-9000034-01	MicroHAWK MV-20-to-MINI Hawk Adapter Plate Kit
	Documentation	
	37-000010-01	Omron Microscan Tools Drive (Software, documentation, links to website)

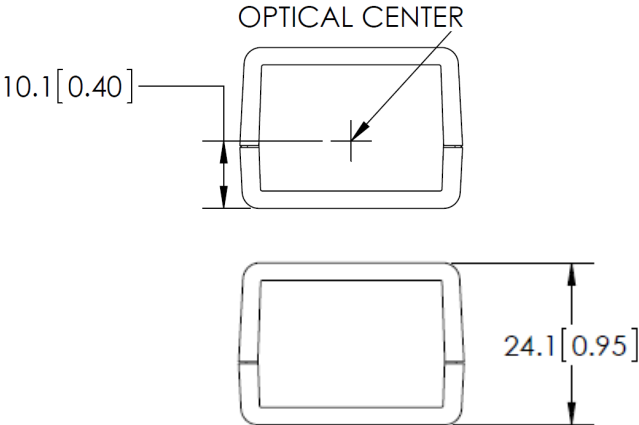| MicroHAWK MV-30 Connectivity Kits	
98-9000048-01	Kit, Cable, DB15 to Ext. Power/RS-232 with Power Supply, MV-30 – includes 97-9000006-01 and 61-9000037-01
98-9000049-01	Kit, Cable, DB15 to Ext. Power/USB with Power Supply, MV-30 – includes 97-9000006-01 and 61-9000038-01
98-9000050-01	Kit, Cable, DB15 to Ext. Power/USB, I/O with Power Supply, MV-30 – includes 97-000011-02 and 61-9000039-01 Recommended items (not included with kit): • 99-000019-01, Visible, NPN, Light On, 5VDC • 61-000151-01, Flying Lead Cable
MicroHAWK Power Supplies	
97-9000006-01	Power Supply, 5V – for use with cables 61-9000037-01 and 61-9000038-01
97-000011-02	Power Supply, 100-240VAC, +5VDC, 2-Pin U.S./Euro Plug
97-000012-01	Power Supply, 100-240VAC, +24VDC, TRK 3-Pin, U.S./Euro Plug
MicroHAWK Cables	
61-9000034-01	Cable, USB A to Micro B, 6 ft., MV-20
61-9000045-01	Cable, USB A to Micro B, 3 ft., MV-20
61-9000037-01	Cable, DB15 to Ext. Power/RS-232, MV-30
61-9000038-01	Cable, DB15 to Ext. Power/USB, MV-30
61-9000039-01	Cable, DB15 to Ext. Power/USB, I/O, MV-30
61-9000043-01	Cable, DB15 to BUS Power USB, MV-30
61-9000102-01	Cable, DB15 to USB/RS-232 Triggered, MV-30
61-9000054-01	Cable, M12 12-Pin Socket to 9-Pin Socket and M12 Plug
61-9000088-01	Cable, M12 12-Pin Socket to USB Keyboard Wedge and M12 Plug
MicroHAWK Mounting Accessories	
98-9000034-01	Kit, Adapter, MS-4 to MV-20
98-9000041-01	Kit, L-Bracket, MicroHAWK
98-9000047-01	Kit, 1/4-20 Camera Mount, MicroHAWK
98-9000052-01	Kit, Mounting Stand, Ram, MS-3, MS-4, MINI, MicroHAWK, 4"
98-9000053-01	Kit, Mounting Stand, Ram, MS-3, MS-4, MINI, MicroHAWK, 3"
98-9000054-01	Kit, Mounting, APG, MS-4, MINI, MicroHAWK
98-9000059-01	Kit, Adapter Plate, MS-4, MINI to MicroHAWK
Other Accessories	
98-9000043-01	Kit, Diffuser, MicroHAWK MV-30/MV-40
98-9000129-01	Kit, Polarizer, MicroHAWK MV-30/MV-40
98-9000045-01	Kit, Red LED, MicroHAWK MV-30/MV-40
98-9000046-01	Kit, White LED, MicroHAWK MV-30/MV-40
98-9000051-01	Kit, Window, MicroHAWK MV-30/MV-40
98-9000057-01	Kit, Right-Angle Mirror, MicroHAWK MV-20
98-9000058-01	Kit, Right-Angle Mirror, MicroHAWK MV-30/MV-40
98-9000064-01	Kit, Isolation Mounting, M3, MicroHAWK MV-30/MV-40

Label Information

Each MicroHAWK MV-20 / MV-30 / MV-40 Smart Camera has a label that contains important information about that camera.
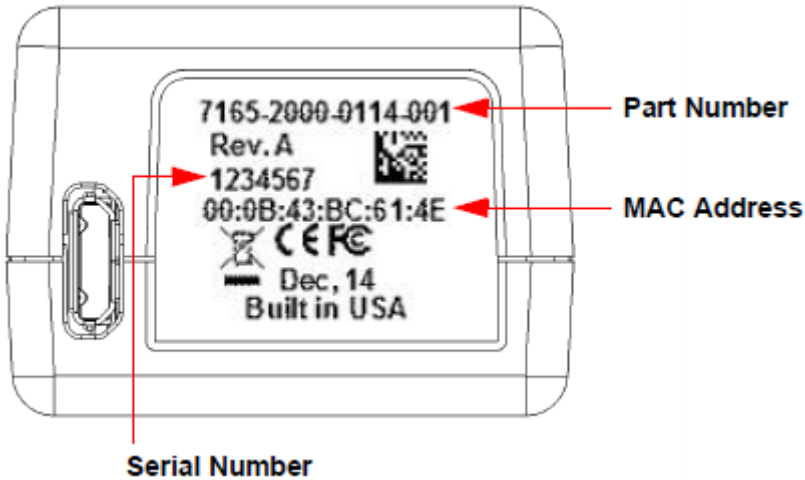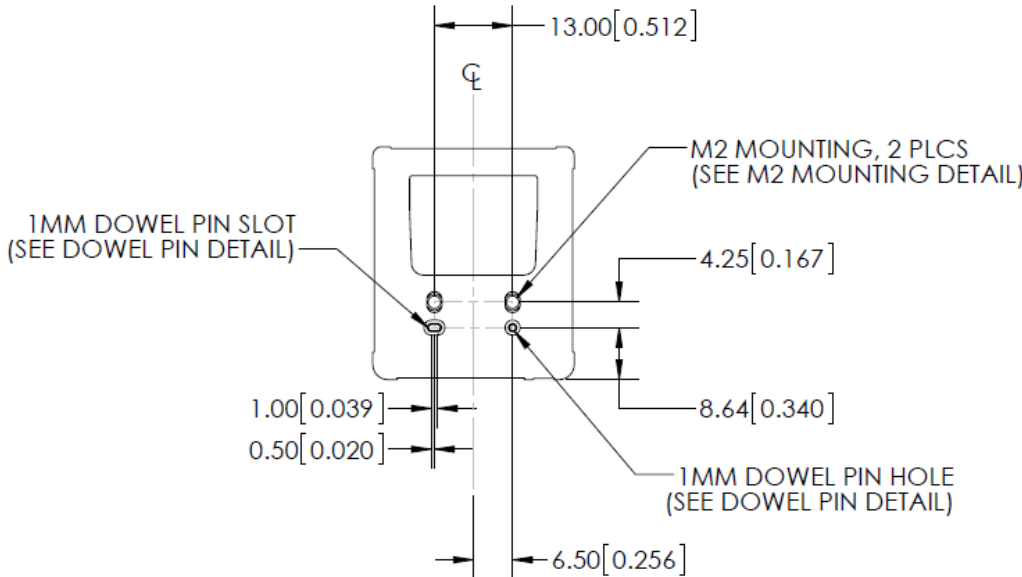

- **Part Number –** The Omron Microscan part number of your MicroHAWK Smart Camera.
- **Serial Number –** The serial number of your MicroHAWK Smart Camera.
- **MAC Address –** The MAC address of your MicroHAWK Smart Camera.
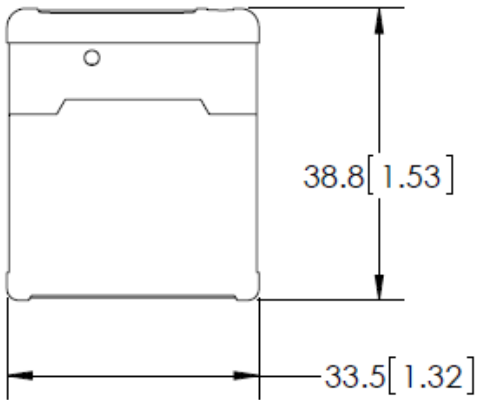
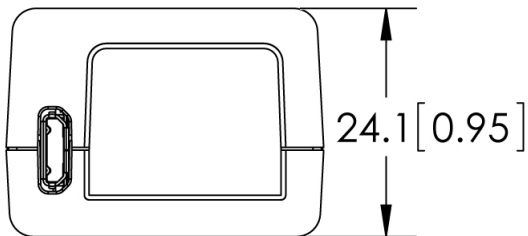# Mechanical Dimensions

MV-20 Front

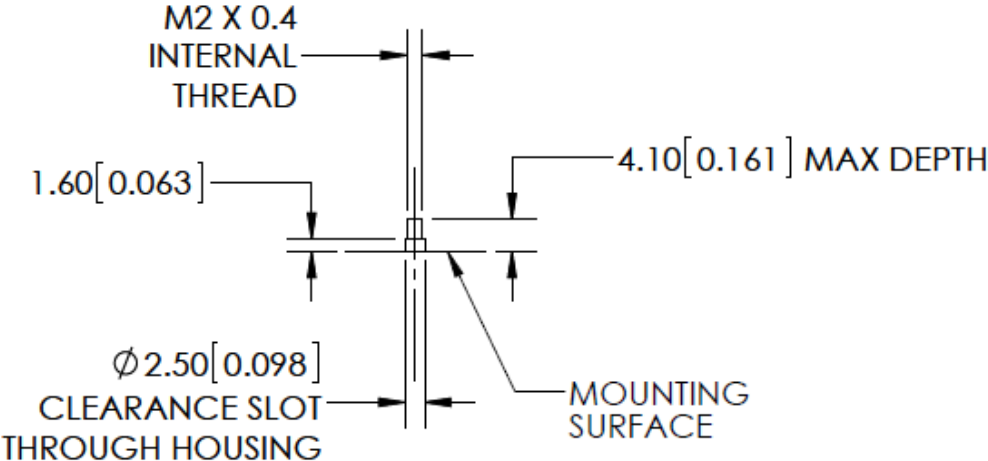OPTICAL CENTER

10.1[0.40]

24.1[0.95]

MV-20 Base

13.00[0.512]

₵

M2 MOUNTING, 2 PLCS
(SEE M2 MOUNTING DETAIL)

1MM DOWEL PIN SLOT
(SEE DOWEL PIN DETAIL)

4.25[0.167]

1.00[0.039]

0.50[0.020]

8.64[0.340]

1MM DOWEL PIN HOLE
(SEE DOWEL PIN DETAIL)

6.50[0.256]

MV-20 Top

38.8 [1.53]

33.5 [1.32]

MV-20 Back

24.1 [0.95]

MV-20 M2 Mounting Detail

M2 X 0.4
INTERNAL
THREAD

4.10[0.161] MAX DEPTH

1.60[0.063]

⌀2.50[0.098]
CLEARANCE SLOT
THROUGH HOUSING

MOUNTING
SURFACE

MV-20 Dowel Pin Detail

⌀1.00[0.039] HOLE/SLOT

2.40[0.094]
MAX DEPTH

1.60[0.063]

⌀2.50[0.098]
CLEARANCE HOLE/SLOT
THROUGH HOUSING

MOUNTING
SURFACE
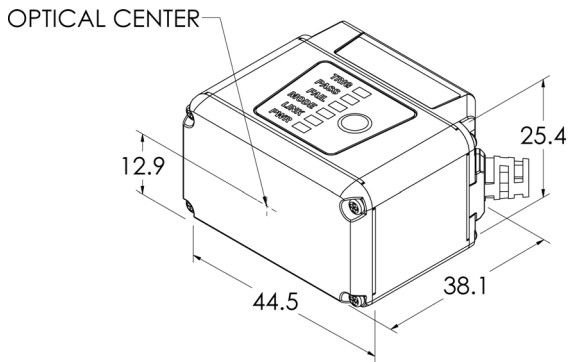
MV-30 Front
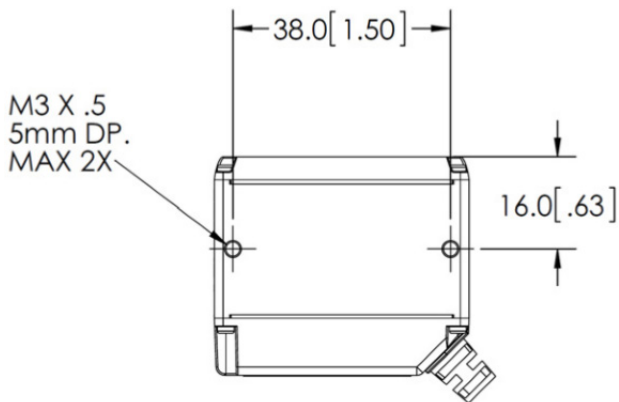
MV-30 Base

MV-30 Top
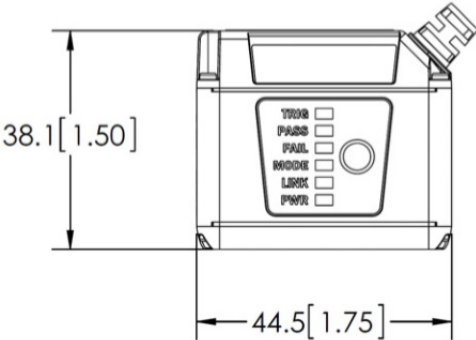
MV-30 Side
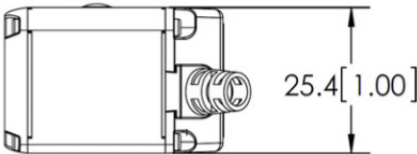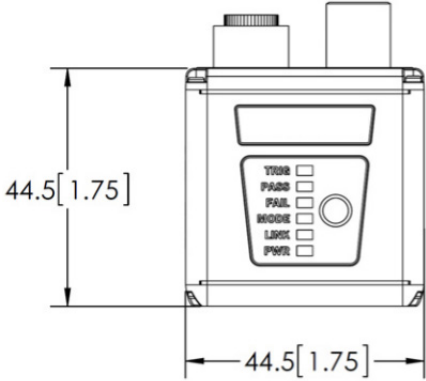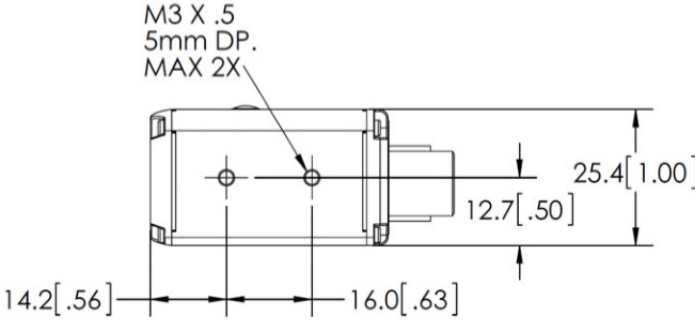
MV-40 Front
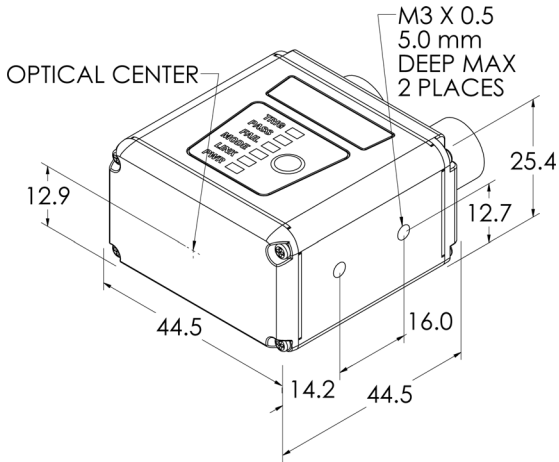
MV-40 Base
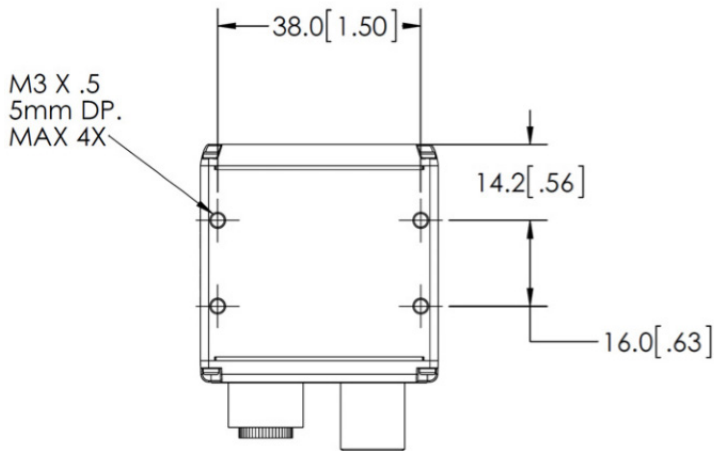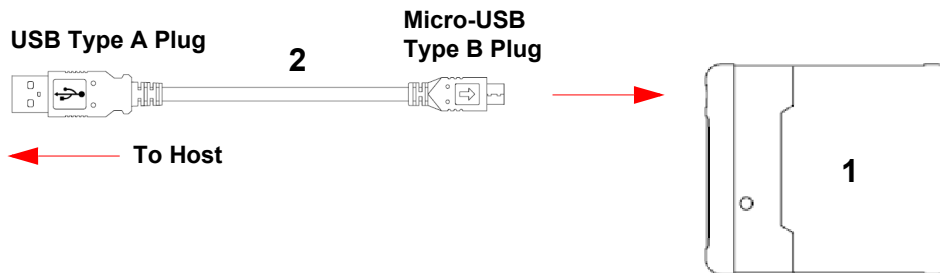
MV-40 Top

MV-40 Side

Cabling Configurations

MV-20

Note: The numbers in the diagram correspond to the numbers in the **Hardware Components and Accessories** table.

- Mount the camera securely in its camera stand (not supplied).

- Mount the camera (as required by the application.

- Connect the Micro-USB Type B side of the USB cable to the MicroHAWK MV-20.

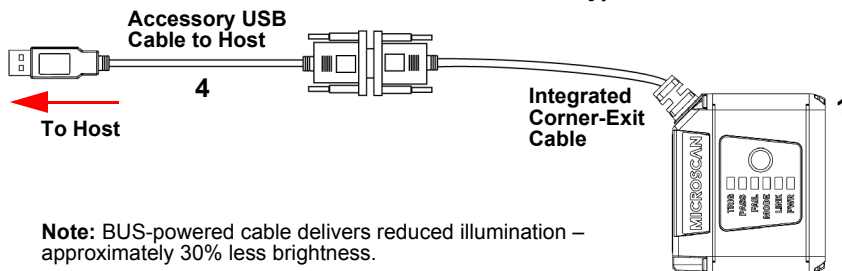- Connect the USB Type A side of the USB cable to the host.

MV-20 Power Requirements

The MicroHAWK MV-20 Smart Camera is a USB 2.0 bus-powered device. The camera is a high-powered device, and the host must be capable of supplying up to five unit loads (500 mA).
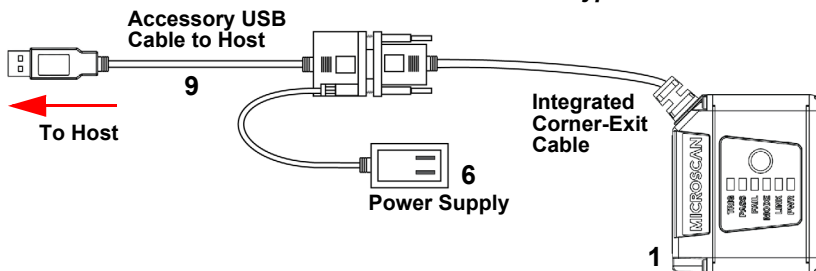
MV-30

Note: The numbers in the diagram correspond to the numbers in the **Hardware Components and Accessories** table.

- Mount the camera securely in its camera stand (not supplied).

- Mount the camera as required by the application.

- Connect the integrated corner-exit cable to the MicroHAWK MV-30.

- Connect the accessory USB cable to the integrated corner-exit cable.

- Connect the USB Type A side of the USB cable to the host.

- Connect the power cable into the power source.

MicroHAWK MV-30 with DB15 to BUS Power USB Type A

Accessory USB Cable to Host

4

To Host

Integrated Corner-Exit Cable

1

Note: BUS-powered cable delivers reduced illumination – approximately 30% less brightness.

MicroHAWK MV-30 with DB15 to Ext. Power/USB Type A

Accessory USB Cable to Host

9

To Host

Integrated Corner-Exit Cable

6

Power Supply

1

MicroHAWK MV-30 with DB15 to Ext. Power/RS-232

MicroHAWK MV-30 with DB15 to Ext. Power/USB, I/O
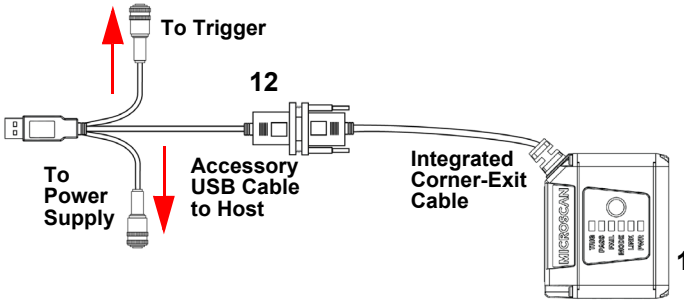
MicroHAWK MV-30 with DB15 to USB/RS-232, Triggered
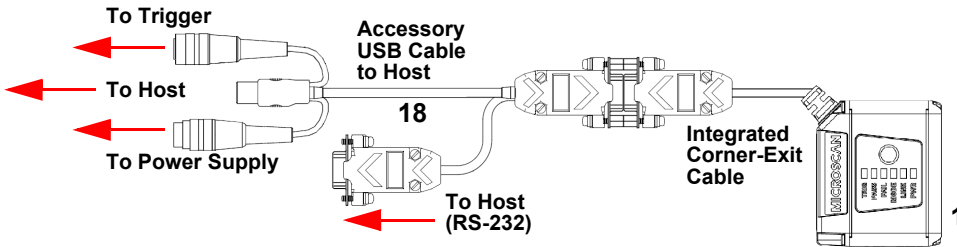
MicroHAWK MV-30 with IB-131 and IC-332
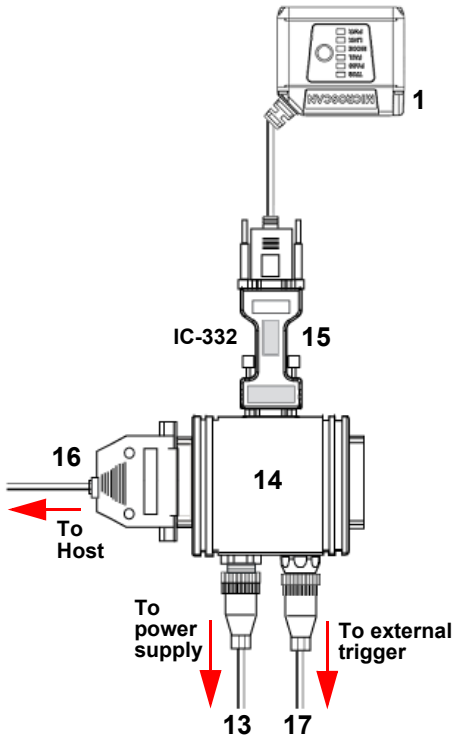
MV-30 Power Requirements

The MicroHAWK MV-30 Smart Camera is an RS-232 or USB 2.0 bus-powered device. The camera is a high-powered device, and the host must be capable of supplying up to five unit loads (600 mA).

MV-40

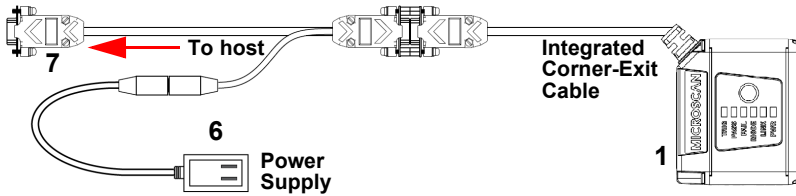**Note:** The numbers in the diagram correspond to the numbers in the **Hardware Components and Accessories** table.

- Mount the camera securely in its camera stand (not supplied).

- Mount the camera as required by the application.

- Connect the power cable to the MicroHAWK MV-40.

- Connect the Ethernet cable to the MicroHAWK MV-40.

- Connect the Ethernet cable to the host.

- Connect the power cable into the power source.

MicroHAWK MV-40 Simple Configuration

2

MicroHAWK MV-40 with QX-1 Interface Device

21

22

**Common
(12-Pin Plug
to 12-Pin
Socket)**

**To Host
(Ethernet
8-Pin Plug
to RJ45)**

1

2

3

T

20

19

22 or 23

To Trigger

**To Power
Supply**

MicroHAWK MV-40 M12 12-Pin Socket to 9-Pin Socket and M12 Plug

To Power Supply (19) or: Flying Lead Cable (61-000167-02); QX-1; MS-Connect 210.

25

1

To Host (RS-232)

To Ethernet
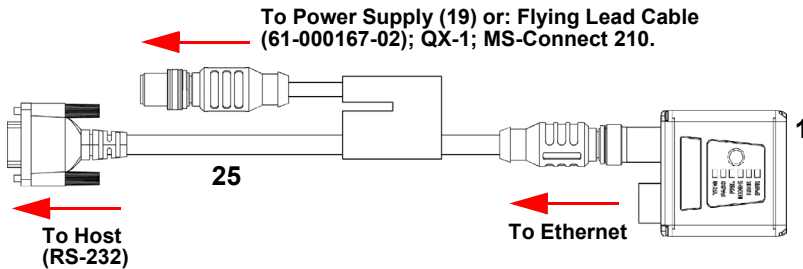
MV-40 Power Requirements
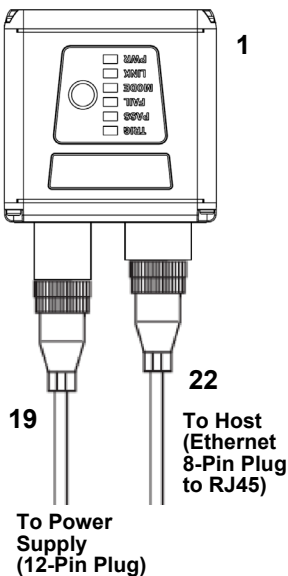
The MicroHAWK MV-40 Smart Camera is an RS-232-powered device. The camera is a high-powered device, and the host must be capable of supplying up to twenty-four unit loads (150mA).
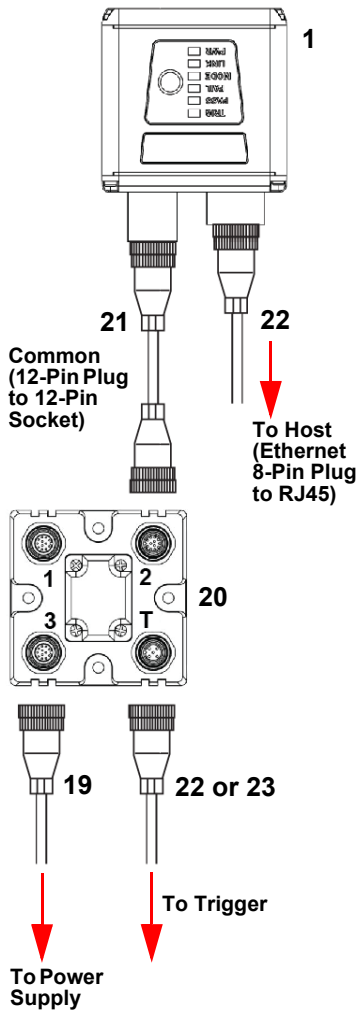
Mounting the Camera

Mount and Position the Camera

1. Position the camera at a focal distance of one inch or more from a test object.
2. Tip the camera relative to the object to avoid the glare of direct (specular) reflection. The case parting line should be perpendicular to the plane of the symbol by either pitching the symbol or the camera. Avoid excessive skew or pitch. Maximum skew is ±30°; maximum pitch is ±30°.
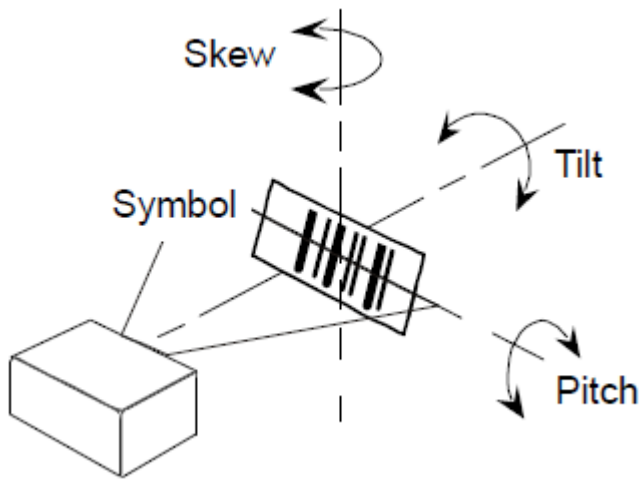
I/O Wiring

MicroHAWK MV-30

Direct Input / Output Diagrams (MV-30)

Trigger Input Example

Trigger, New Master Inputs: 3 to 24V rated, 1mA @ 5VDC
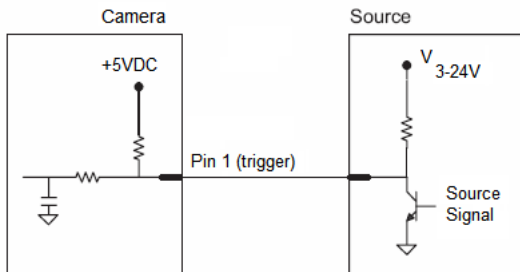
Output Examples

Outputs (1, 2, 3): 5V TTL compatible, can sink 10mA and source 2mA
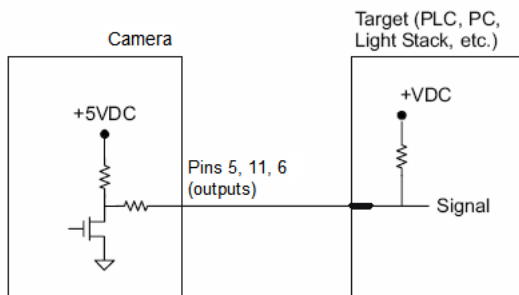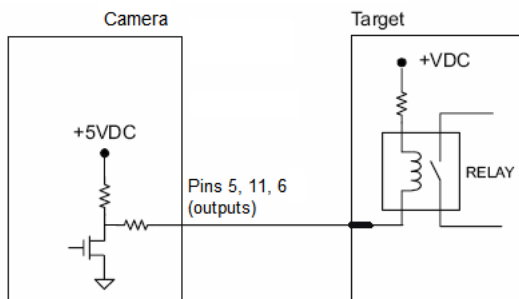
Optoisolator Trigger Inputs for IC-332 (MV-30)

Trigger input can be fully electrically isolated from an NPN or PNP signal source.

	Minimum	Maximum
$V_{IN-HIGH}/I_{IN-HIGH}$	4.5V/3.0mA	28V/15mA
V_{IN-LOW}/I_{IN-LOW}	0V/0mA	2.0V/1mA
Pulse Width$_{min}$	48 µs	
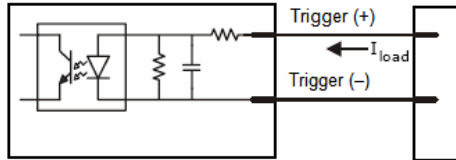
Input Examples

Fully Optoisolated
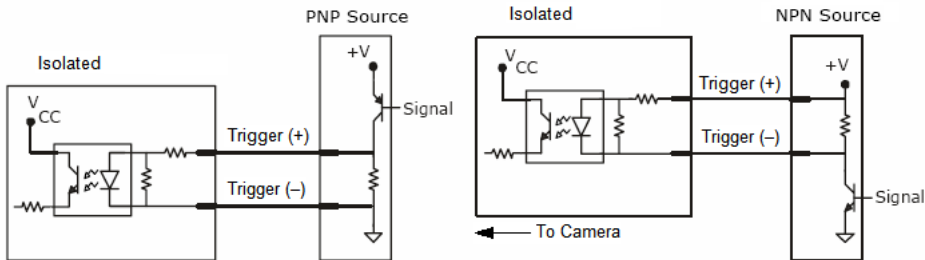
Not Optoisolated
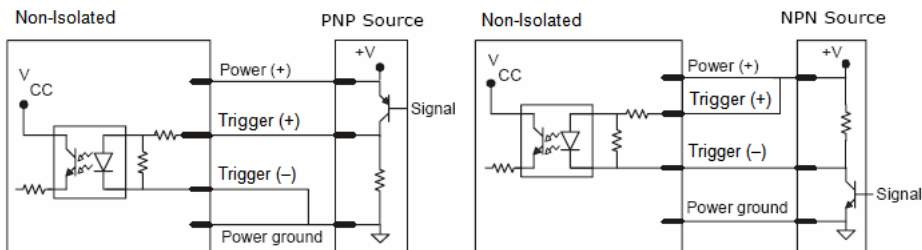
New Master Pin (MV-30)
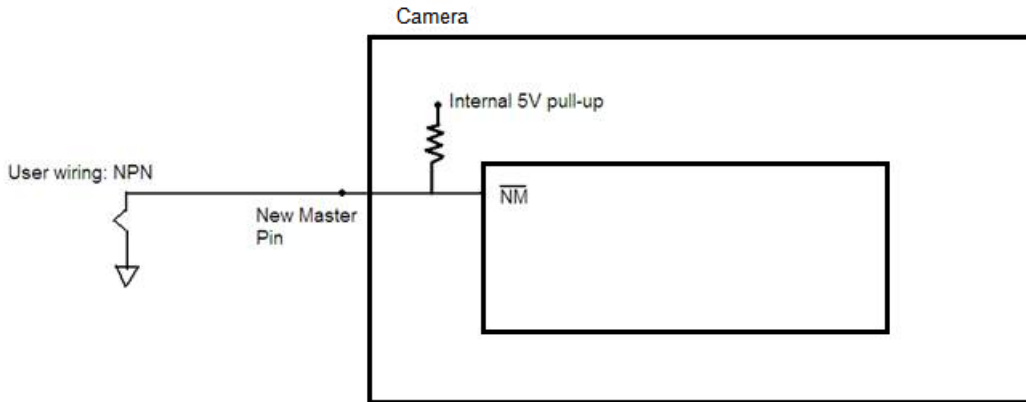
MicroHAWK MV-40

Optoisolated Outputs (MV-40)

The camera 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 (MV-40)
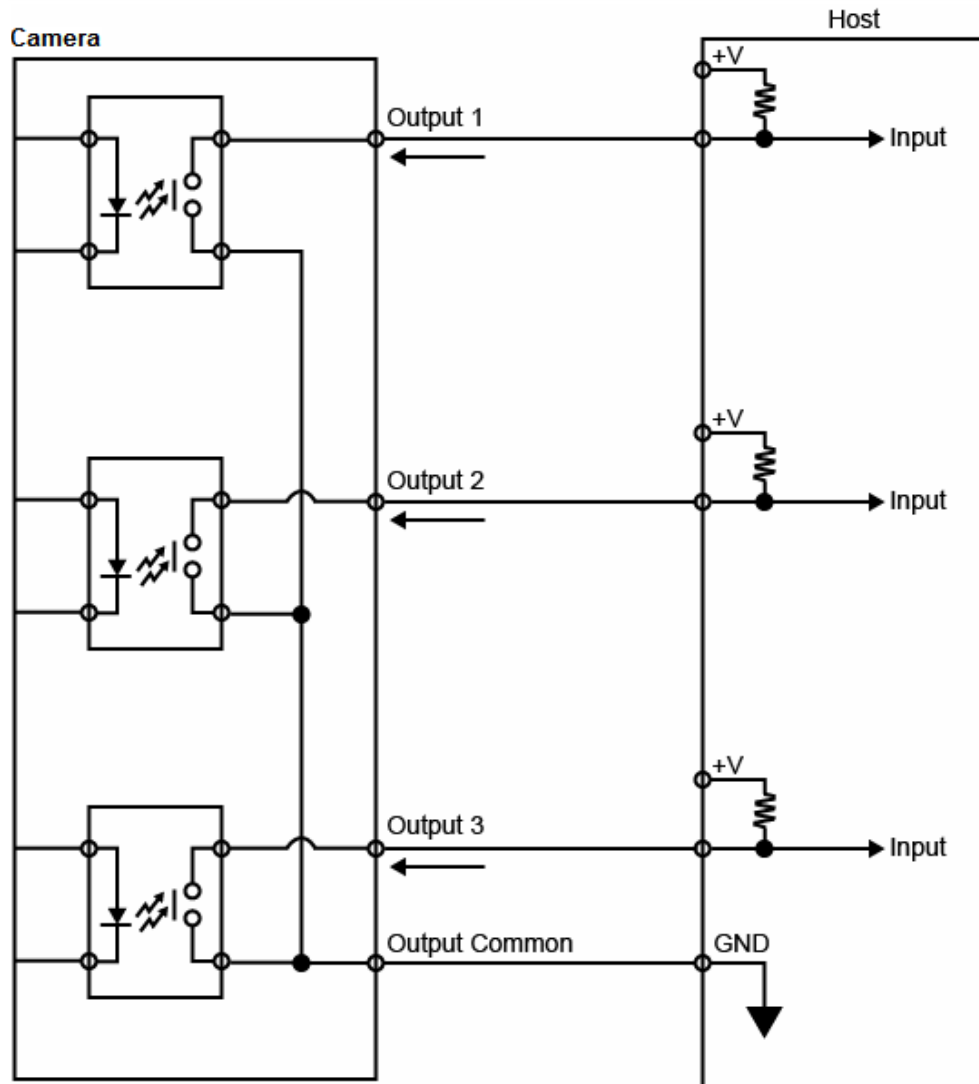
NPN Output for External Load (MV-40)

2

System Components
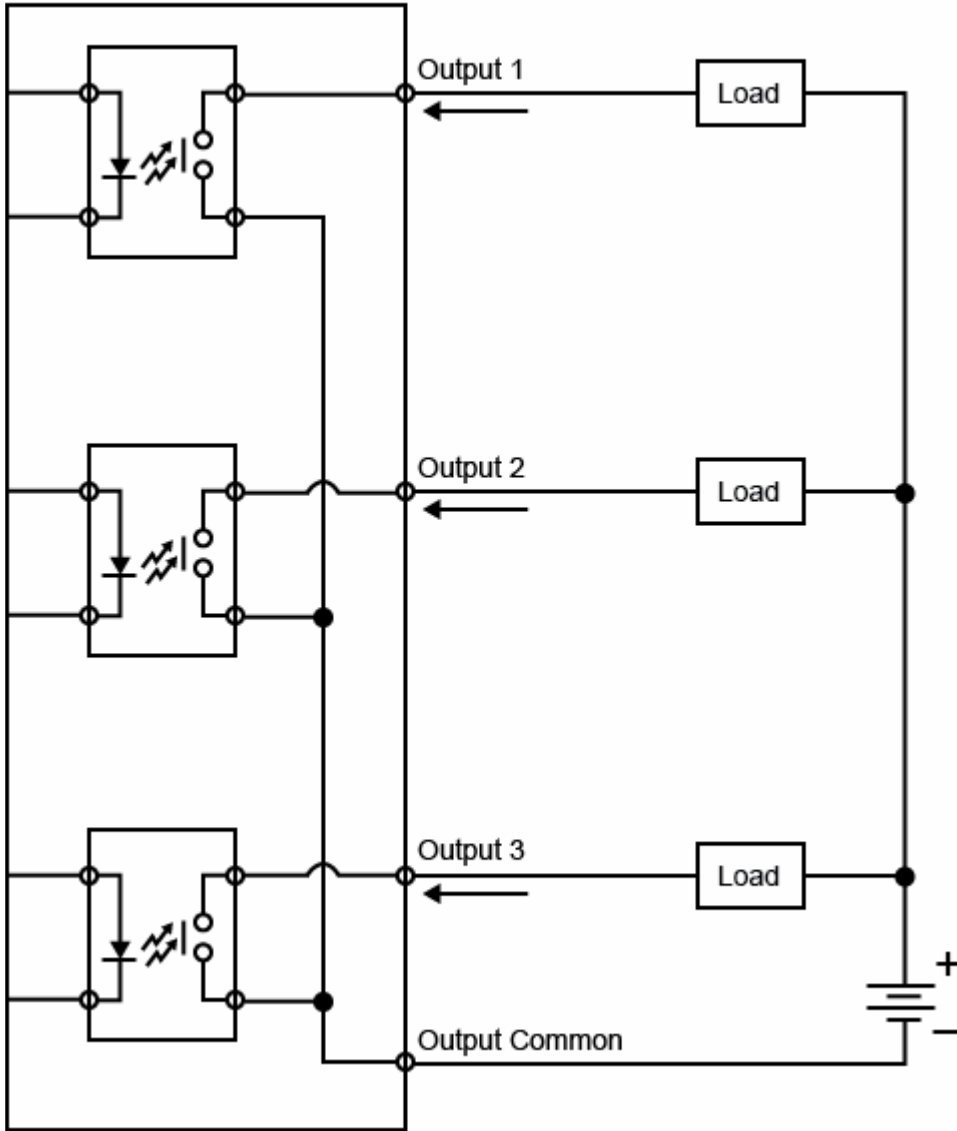
PNP Output for Host Input (MV-40)

2-25
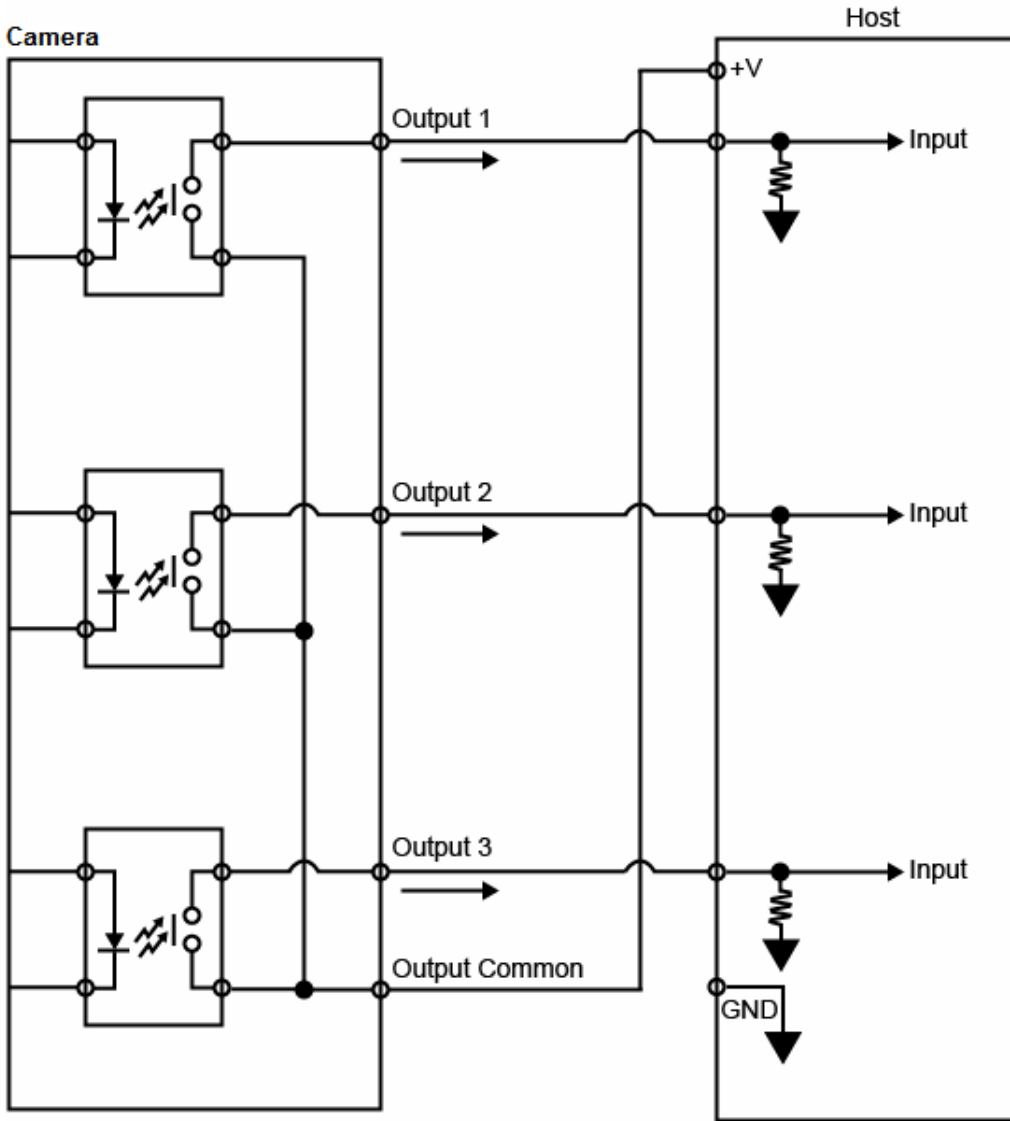
PNP Output for External Load (MV-40)
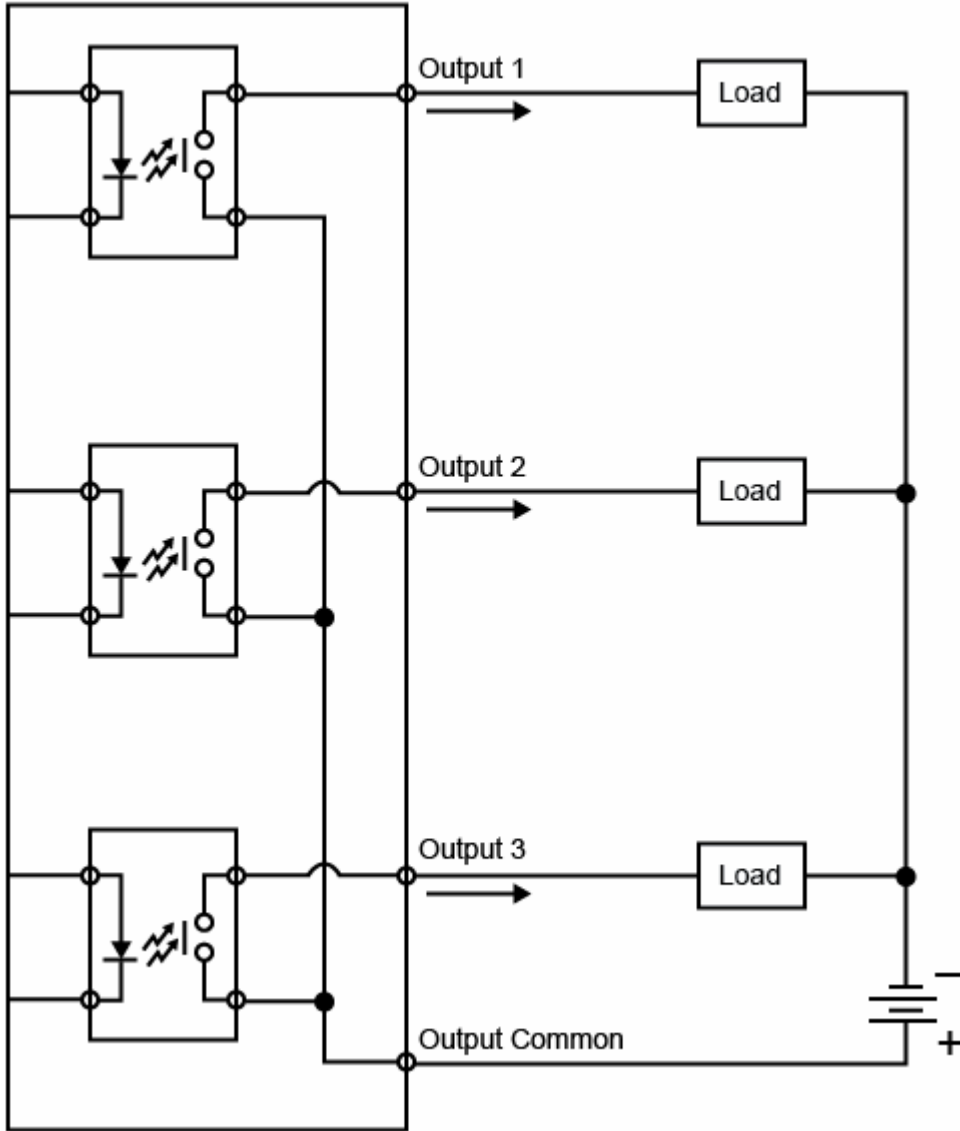
Optoisolated Inputs (MV-40)

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 (MV-40)

CLC = Current Limiting Circuit

PNP (MV-40)

CLC = Current Limiting Circuit
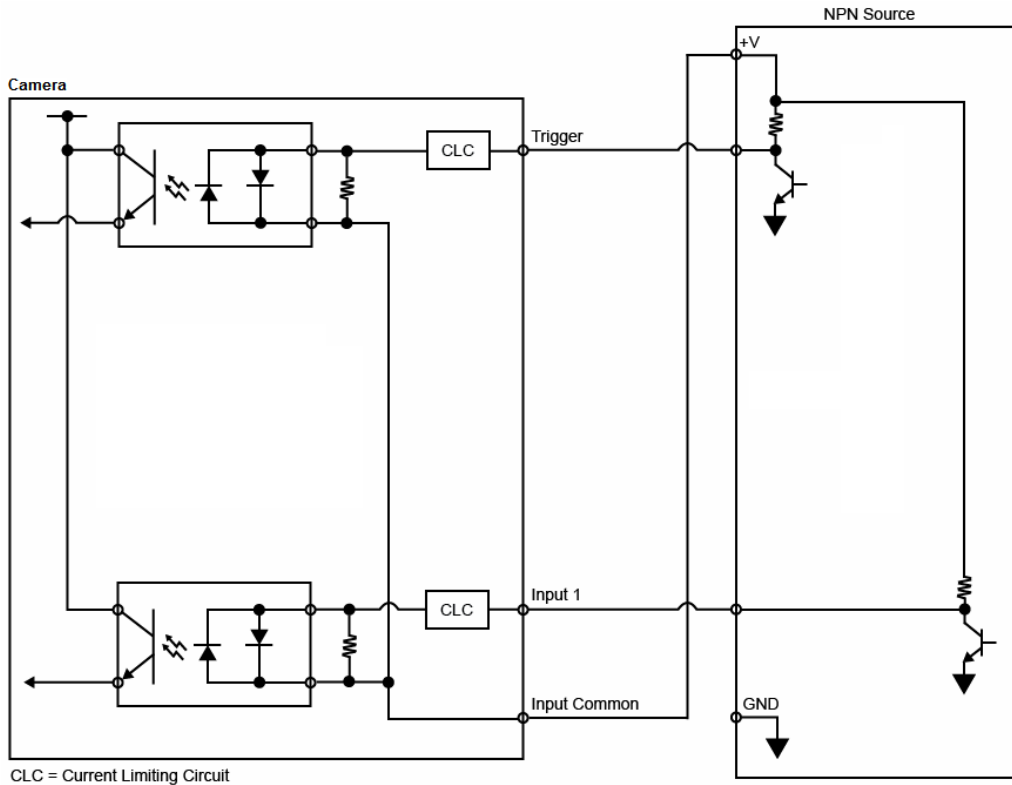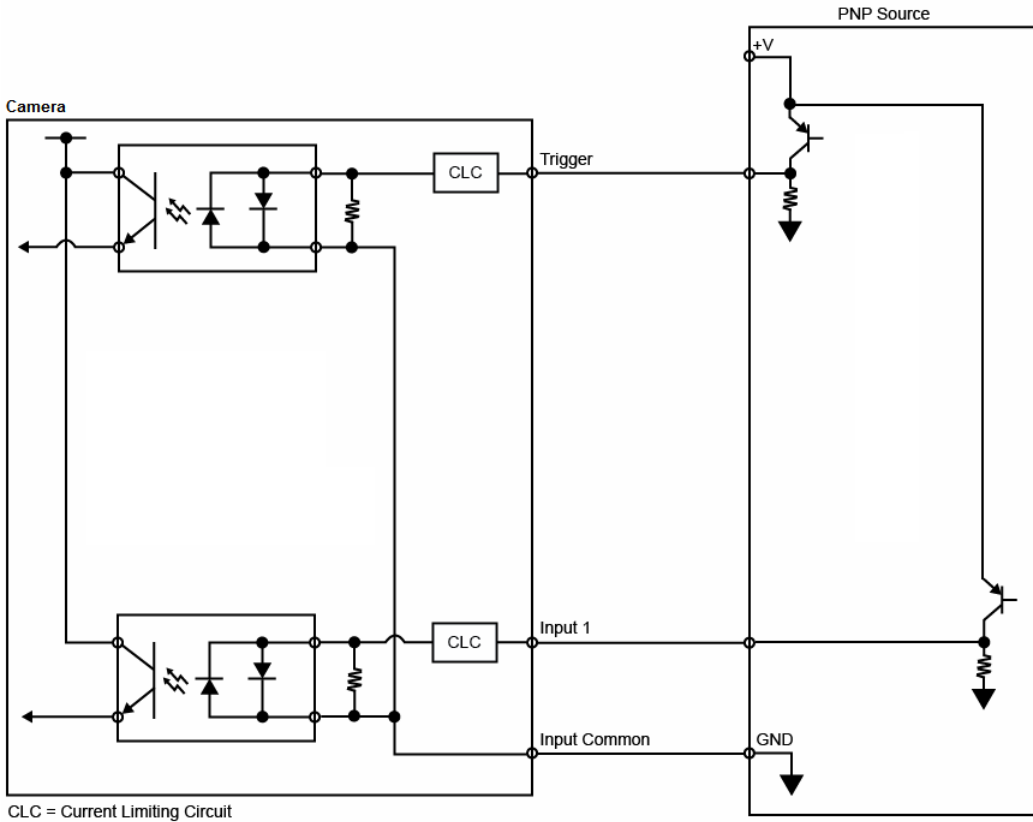
Example Wiring (MV-40) for PLC Communications, NPN Outputs, NPN Inputs

M12 12-pin plug
flying lead cordset

Terminal Strip

PLC

Output 1	Pin 5	Gray		●	PASS/FAIL
Output 2	Pin 11	Gray/Pink		●	DATA READY
Output 3	Pin 6	Pink		●	OPTIONAL
24V+	Pin 2	Brown		●	24V+
Input Common	Pin 8	Red			
Trigger	Pin 1	White		●	TRIGGER +
Output Common	Pin 12	Blue/Red		●	TRIGGER –
Ground	Pin 7	Blue			
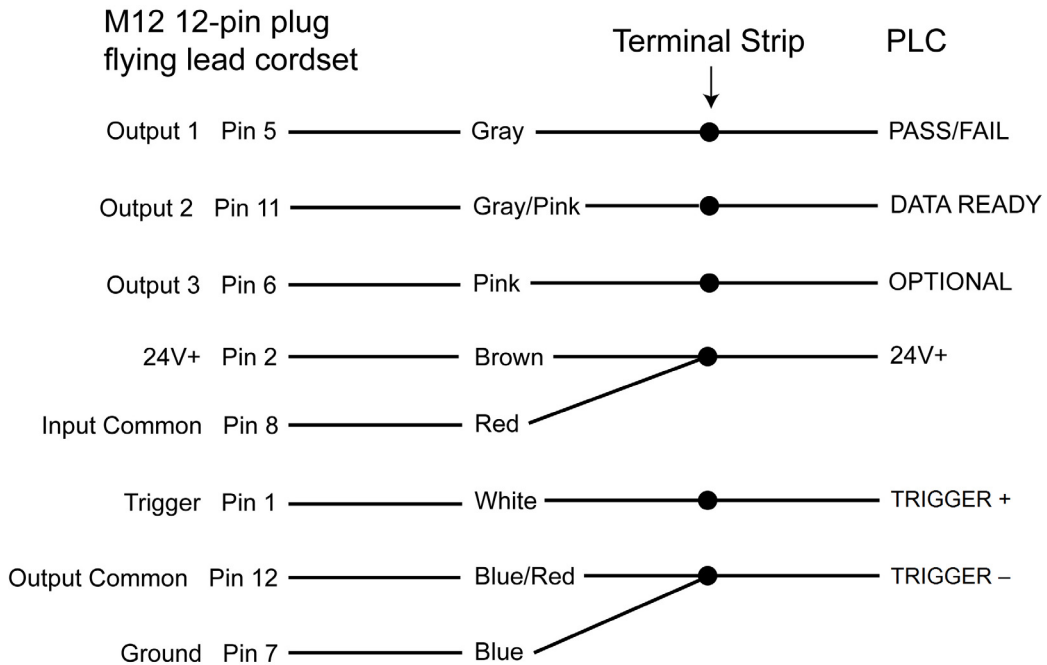
Grounding and Power

Ground and Shield Considerations

Proper grounding is necessary for operator safety, noise reduction, and the protection of equipment from voltage transients. Buildings, including any steelwork, all circuits, and all junction boxes must be grounded directly to an earth ground in compliance with local and national electrical codes.
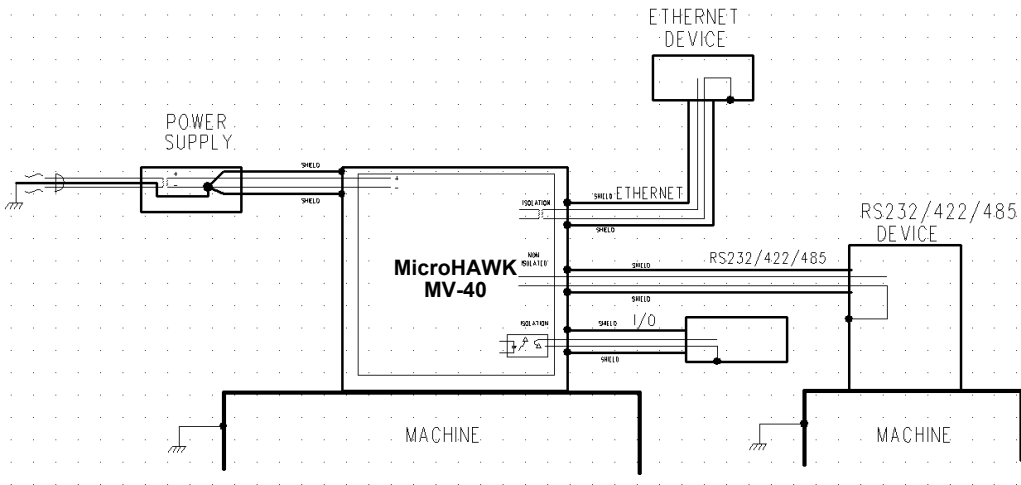
An earth ground is provided through the cable shields and chassis of the camera.

Ground Loops

Ground loops (signal degradation due to different ground potentials in communicating devices) can be eliminated or minimized by ensuring that both the host, imager, and their power supplies are connected to a common earth ground.

Expected Power and Ground Connections for Proper Operation
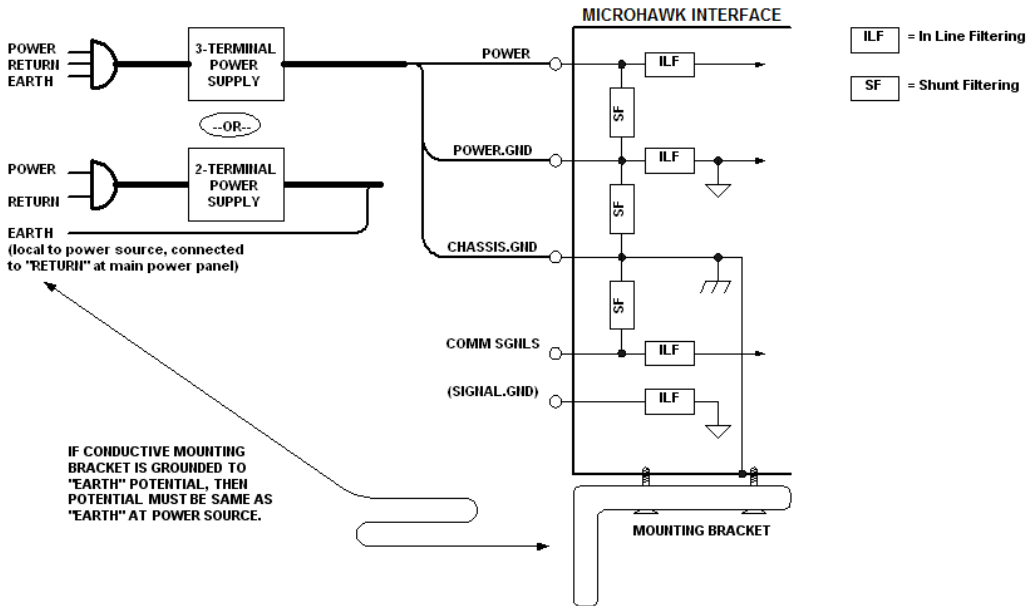
Grounding Notes

- Ensure that mounting bracket "Earth" is at the same potential as power source "Earth".
- Supply "Return" and "Earth" ground must be stable, low-impedance reference points.
- "2-Terminal Power Supply" must still provide an "Earth" connection to the imager.
- "Signal Ground" can be used for communications and/or discrete signal ground reference. It must **not** be used as Power Ground or Earth Ground.

MicroHAWK Power Requirements

Refer to this table when determining the power requirements for your camera.

MicroHAWK MV-20	5VDC ± 5%; 350mA at 5VDC (typ.)
MicroHAWK MV-30	5V ± 5%; 600mA at 5VDC (typ.)
MicroHAWK MV-40	4.75V – 30V; 150mA at 24VDC (typ.)

I/O Filtering and Debounce

Trigger Debounce is the ability of the system to accommodate switching noise on a trigger state change – a common issue with relays that have some intermittent contact while engaging.

Trigger overruns (when the vision system is triggered faster than the device can process) can be avoided by increasing the "debounce" time in the camera definition file located in the C:\Microscan\Vscape\Drivers\CamDefs directory.

The I/O Line Debounce High Time and IO Line Debounce Low Time can be added to the file as in the example below. Debounce time is 1 ms (1,000 µs).

Note: Although the value entered for the "IO Line Debounce Time" is in microseconds, it will only be rounded up to a millisecond value. For example, entering the value **1001** will resolve to 2 ms; entering a value of **2800** will resolve to 3 ms.

The min value for "IO Line Debounce Time" is 0, which disables software debounce altogether. The maximum value is 100000 (100 ms).

We have the standard debounce as described for the trigger:

```
IO Line Debounce High Time          1000 //usecs (default is 0)
IO Line Debounce Low Time           1000 //usecs (default is 0)
```

The MicroHAWK has an I/O Line Filter Time as well:

```
IO Line Filter High Time            100  //usecs (default is 100)
IO Line Filter Low Time             100  //usecs (default is 100)
```

I/O Filter is the ability to ignore any signals on the I/O lines that are less that the "Filter Time" long. Sometimes, electrical interference puts spikes on the line. This feature makes it ignore them until the signal that is seen on the I/O line is longer than the filter time.

Camera Definition File Example

```
// Camera Definition File
// Version: 1.04

Camera Name                        MicroHAWK 1280x960 // Name Displayed in
Camdef Selection Dialog
Digitizer Type             6001                                // Number
associated with Trident SXGA

Stride                                  1280    // Image Width
Rows                                    960            // Image Height
X Offset                           0            // Image X Offset
Y Offset                           0            // Image Y Offset
Bits Per Pixel             8              // Bits that represent Pixel Value
Pixel Type                         0            // Type of Pixel:
MONOCHROME=0, COLOR_RGB=1, COLOR_BGR=2, COLOR_BAYGR8=3, COLOR_BAYRG8=4,
COLOR_BAYGB8=5, COLOR_BAYBG8=6, COLOR_HSI=7
Image Structure      1              // Pixel Organization: Packed=1, TwoPlanes =
2, ThreePlanes = 3

Async Control              1              // Controllable shutter time. Usually
using a pulse width specified in usecs
Usecs Per Frame            18518  // Fastest time to acquire a frame:  54 FPS
                                                // -1 Disables
timeout feature
Binning                            0
Zoomed                                 0

// IO Configuration
GPIO Edit Mask             0x0000
GPIO Defaults              0x0001 // 1 General Purpose Input 3 General Purpose
Outputs
GPIO Count                         4
GPIO Inputs                        1
GPIO Outputs               3
Sensors                                1              // One input dedicated
to Trigger signal
Strobes                                0

Virtual IO                         2048

IO Line Filter High Time           100            //usecs (default is 100)
IO Line Filter Low Time            100            //usecs (default is
100)
IO Line Debounce High Time         0      //usecs (default is 0)
IO Line Debounce Low Time          0      //usecs (default is 0)
Sensor Trigger Delay Time          0              //usecs
Custom External Strobe Delay Time0     //usecs

// Focus & Photometry Ranges
Gain Dflt                          20
Gain Min                           0
Gain Max                           100            // 0 to 100%
Exp Dflt                           4000
Exp Min                                66
Exp Max                                58825  // 1/17 to 1/15,000
Focus Dflt                         100            // 100 mm default
Focus Min                          50
Focus Max                          500            // 50 to 500 mm
```

Status Indicators

MV-20

The top of the MicroHAWK MV-20 Smart Camera has an LED that indicates whether or not the device is powered-on.

Power Indicator LED

PWR LED	**On**	Power On
	Off	No Power Applied to Unit

Additional User Feedback

• Green Flash – A green flash from the front of the unit indicates a Good Read.

• Blue Targeting Pattern – The blue targeting pattern from the front of the unit allows the user to center an object in the camera's field of view.

2

System Components

MV-30, MV-40 Status Indicators

The top of the MicroHAWK MV-30 and MV-40 Smart Cameras have multiple LEDs that indicate different inspection, trigger, camera, communication, and power states.

PASS		Inspection Status
TRIG		Trigger Status
MODE		Camera Status
LINK		Communication Status
FAIL		Inspection Status
PWR		Power Status
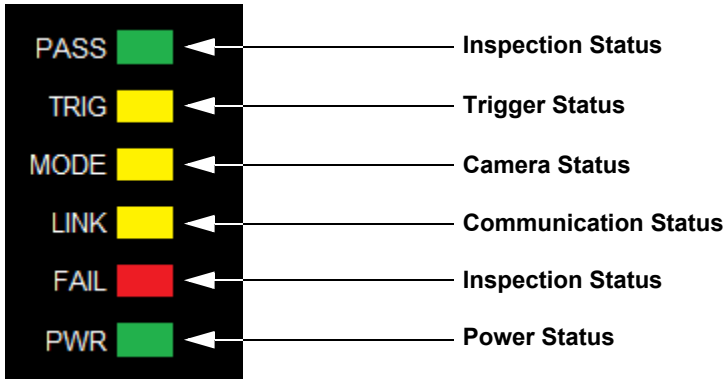
PASS/FAIL	**On**	Active State
	Off	Inactive State
TRIG	**On Steady**	Continuous Trigger
	Off	Waiting for Trigger Event
	On Flashing	Trigger Event
MODE	**On Steady**	Unit Ready
	Off	Unit Not Ready
LINK	**On Steady**	Link Established
	Off	No Link/Activity
	On Flashing	Link Established and Activity on Link
PWR	**On**	Power On
	Off	No Power Applied to Unit

Additional User Feedback

- **Green Flash –** A green flash from the front of the unit indicates a Good Read.

- **Blue Targeting Pattern –** The blue targeting pattern from the front of the unit allows the user to center an object in the camera's field of view.

Chapter **2** System Components

3

CHAPTER 3

Getting Started with AutoVISION

This section describes how to set up and use MicroHAWK MV-20, MV-30, and MV-40 Smart Cameras with AutoVISION Software.

Setting Up a Job in AutoVISION

AutoVISION is a critical component of the MicroHAWK's functionality. Designed for use with the MicroHAWK, 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.

Item	Part Number	Description
1	7ABX-YZZZ-LPPP	MicroHAWK MV-20, MicroHAWK MV-30, or MicroHAWK MV-40
2	97-000012-01	Power Supply, 100-240VAC, +24VDC, M12 12-Pin Socket
3	98-000103-02	QX-1 Interface Device
4	61-000162-02	Cordset, Common, M12 12-Pin Socket (Screw-On) to M12 12-Pin Plug
5	61-000160-03	Cordset, Host, Ethernet, M12 8-Pin Plug (Screw-On) to RJ45, 1 m.
6	99-000020-01	Photo Sensor, M12 4-Pin Plug, NPN, Dark Off, 2 m.
Note: Additional cables available in the Omron Microscan Product Pricing Catalog.		

1. Configure MicroHAWK Hardware

• 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.

MicroHAWK MV-40 with QX-1 Interface Device

1

4
Common
(12-Pin
Plug to
12-Pin
Socket)

5
To Host
(Ethernet
8-Pin Plug
to RJ45)

1   **2**   **3**

3   **T**

2
To
Power
Supply

5 or 6
To
Trigger
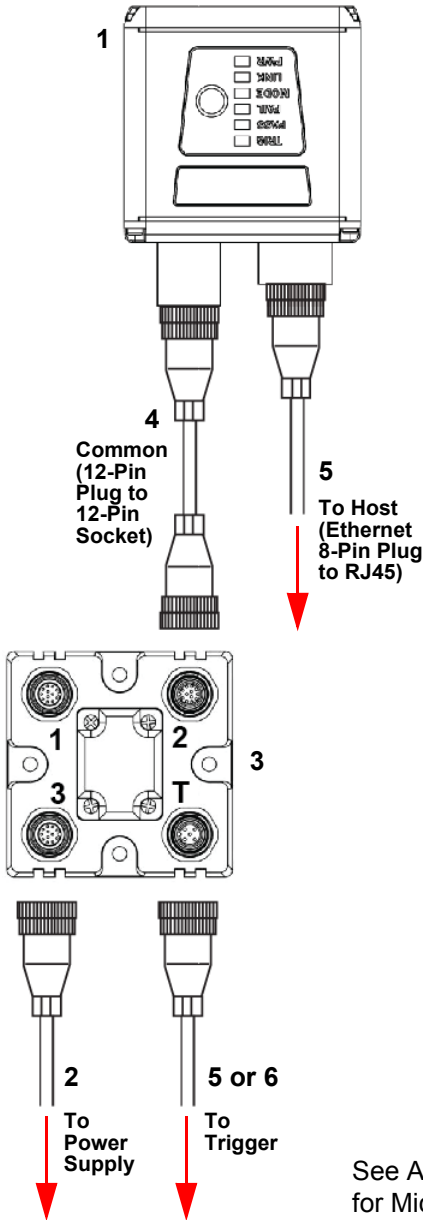
See Appendix A, **Connector Pinouts**, for MicroHAWK pin assignments.

2. Select MicroHAWK in Connect View; Create a Job; 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** drop down menu provides a list of available devices. Hover the mouse over a device to see its details.
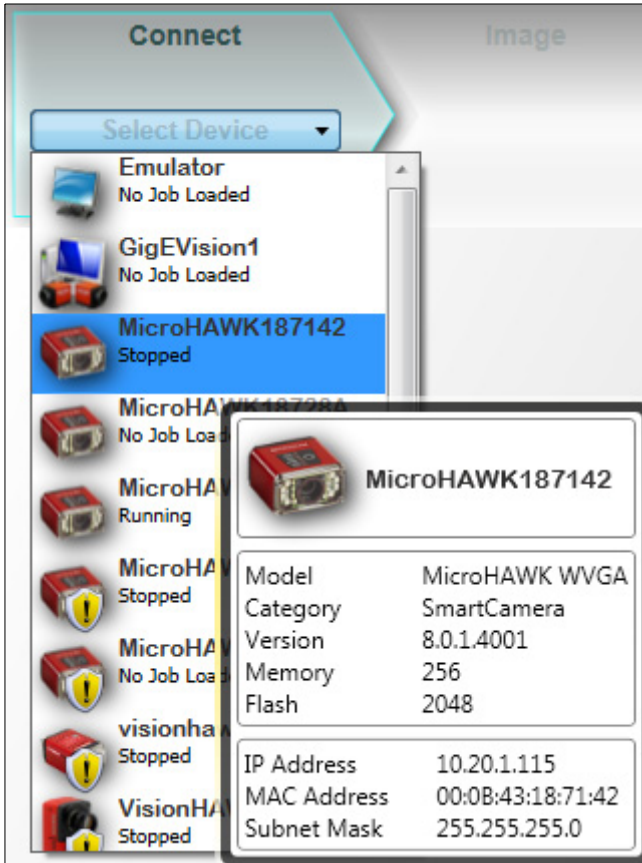
Click the lock icon to take control of the camera. When you have control of the camera, the **Modify** button will appear beneath the camera settings. Click the Modify button to adjust camera settings.

Note: If you are using an MV-20 or MV-30 with a USB cable, the driver has already configured your PC address. If you are using an MV-40, you must set the PC to the same IP range as the default IP address. Default IP address: **192.168.188.2**. Set the PC to the same IP range (example: **192.168.188.100**).

Important: When modifying camera settings, you will need to enter a username and password for the camera if a password has been defined.

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.
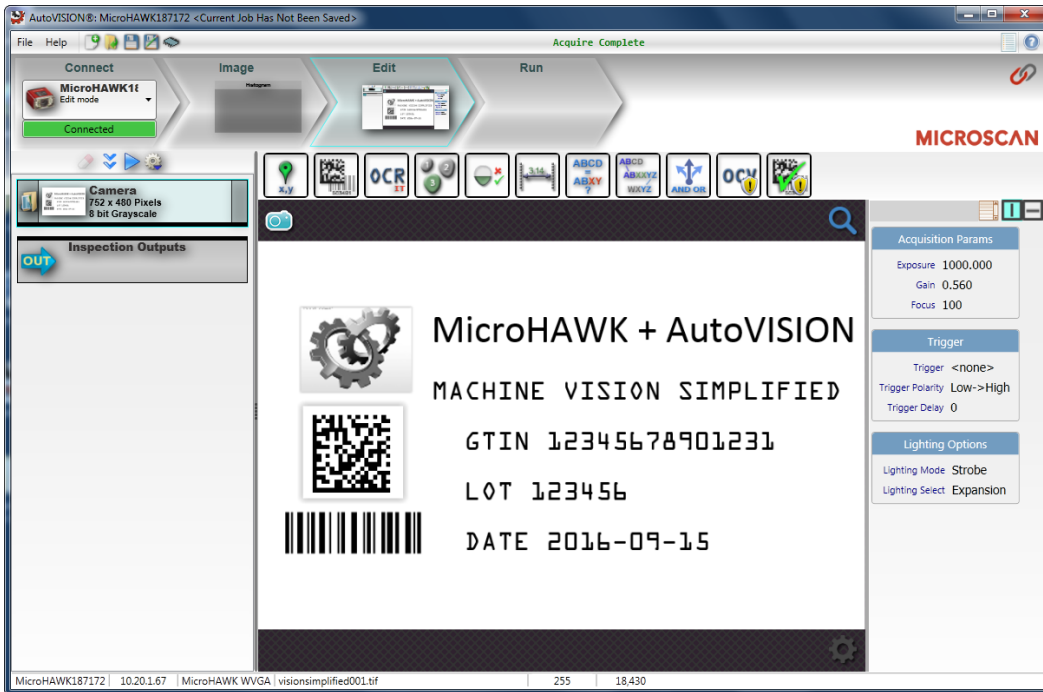
4. Run the Job in AutoVISION

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 MicroHAWK.

PROFINET I/O and IP Address Assignment

When PROFINET I/O is enabled on the unit, the PLC system may control the device name, IP address, and subnet. When this is the case, it is impossible to communicate with the unit from AutoVISION until the PLC has assigned an IP address. When the unit disconnects from a PROFINET controller without disabling PROFINET, it may no longer be reachable from AutoVISION. This condition may persist after cycling power on the unit because the PROFINET I/O configuration is stored in non-volatile memory on the unit.

When disconnecting a unit from a PROFINET controller, it is recommended to always disable PROFINET on the unit first, as this will erase the PROFINET configuration. The unit will then remain reachable under its last known IP address.

It is possible to recover from loss of communication when PROFINET is left enabled, as described below.

APIPA Address Assignment

When the unit fails to obtain a valid IP address, it will fall back on the APIPA (Automatic Private Addressing) protocol after a timeout of 5 minutes.

To get an IP address, the unit will select an address at random in the range 169.254.1.0 to 169.254.254.255 with a subnet mask of 255.255.0.0. The client will then send an ARP packet asking for the MAC address that corresponds to the randomly-generated IPv4 address. If any other machine is using that address, the client will generate another random address and try again until it finds a free IP address.

The device network viewer can be used to discover units with an APIPA address, connect to them, and update the IP address to a desired range.

The default IP address and subnet mask can be restored by pressing the button on top of the unit and holding it for 30 seconds while applying power to the unit.

4

CHAPTER 4 — Optics and Lighting

This section describes the optical and illumination characteristics of MicroHAWK MV-20, MV-30, and MV-40 Smart Cameras.

Optics

The monochrome and color versions of the MicroHAWK MV-20, MV-30, and MV-40 have a built-in CMOS sensor, available in Standard Density, High Density, and Ultra-High Density.

Important: UHD Fixed Focus is only available in 64 mm and 400 mm distances.

UHD Autofocus is only available for SXGA MV-30 and MV-40 cameras.

Sensor Table

	Pixels (H x V)	Shutter	Frames per Second
WVGA	752 x 480, 0.3 MP, Mono	Global	52 fps
SXGA	1280 x 960, 1.2 MP, Mono	Global	40 fps
QSXGA	2592 x 1944, 5 MP, Color	Rolling	5 fps

MV-20 Fixed Focus

MV-20 FOV Chart		Fixed Focus Lens Type					
Camera-to-Part Distance		SD - FOV (mm)		HD - FOV (mm)		UHD - FOV (mm)	
mm	inch	Width	Height	Width	Height	Width	Height
WVGA 50	1.97	49	31	34	22		
102	4.02	94	60	65	41		
190	7.48	170	109	118	75		
300	11.81	265	169	184	118		
SXGA 50	1.97	52	39	36	27		
64	2.52	65	48	45	34	20	15
102	4.02	100	75	69	52		
190	7.48	181	136	125	94		
300	11.81	282	212	196	147		
400	15.75	375	281	260	195	117	88
QSXGA 50	1.97	49	37	34	26		
102	4.02	95	71	66	49		
190	7.48	173	129	120	89		
300	11.81	270	201	187	140		

MV-30 and MV-40 Fixed Focus

MV-30/40 FOV Chart			Fixed Focus Lens Type					
Camera-to-Part Distance			SD - FOV (mm)		HD - FOV (mm)		UHD - FOV (mm)	
(mm)	(inch)		Width	Height	Width	Height	Width	Height
WVGA	50	1.97	49	32	34	22		
	102	4.02	95	60	66	42		
	190	7.48	171	109	118	76		
	300	11.81	266	170	185	118		
SXGA	50	1.97	53	39	36	27		
	64	2.52	66	49	45	34	21	15
	102	4.02	101	75	70	52		
	190	7.48	182	136	126	95		
	300	11.81	283	213	196	147		
	400	15.75	376	282	260	195	118	88
QSXGA	50	1.97	50	37	35	26		
	102	4.02	96	72	67	50		
	190	7.48	174	130	121	90		
	300	11.81	271	202	188	140		

MV-30 and MV-40 Autofocus

MV-30/40 FOV Chart			Autofocus Lens Type					
Camera-to-Part Distance			SD - FOV (mm)		HD - FOV (mm)		UHD - FOV (mm)	
(mm)	(inch)		Width	Height	Width	Height	Width	Height
WVGA	50	1.97	46	29	33	21		
	102	4.02	88	56	64	41		
	190	7.48	159	101	115	74		
	300	11.81	247	158	180	115		
SXGA	50	1.97	49	37	36	27	16	12
	102	4.02	93	70	68	51	32	24
	190	7.48	169	127	123	92		
	300	11.81	263	197	191	144		
QSXGA	50	1.97	47	35	34	25		
	102	4.02	89	67	65	48		
	190	7.48	161	120	117	87		
	300	11.81	252	187	183	136		

MV-30 and MV-40 Long Range SXGA / Autofocus Field of View

Object Distance (mm)	FOV Width (mm)	FOV Height (mm)
75	22	16
100	29	22
200	59	44
300	88	66
400	117	88
500	146	110
600	176	132
700	205	154
800	234	176
900	263	198
1,000	293	220
1,100	322	241
1,200	351	263
1,300	380	285
1,400	410	307
1,500	439	329
1,600	468	351
1,700	498	373
1,800	527	395
1,900	556	417
2,000	585	439

Illumination

Inner LEDs: 4 white, 4 red (625 nm nominal)

Outer LEDs: 8 high-output white or red (617 nm nominal)

Note: MV-20 only has inner LEDs. MV-30 and MV-40 have both inner and outer LEDs. Options are available for IR and blue outer LEDs.

LED Modules

| Description	Left P/N	Right P/N	LED P/N	Wavelength
Expansion, Red	43-9500055-01	43-9500056-01	LA E65F-CAEB-24-1	617 nm
Expansion, White	43-9500055-02	43-9500056-02	NFSW036BLT b3-b6/P9-P12	N/A
Expansion, IR	43-9500055-03	43-9500056-03	SFH 4259S	850 nm
Expansion, Blue	43-9500055-04	43-9500056-04	LB E63C-T2V2-35-34	469 nm

Machine Vision Lighting Principles

Proper lighting is critical to the success of a machine vision application. The MicroHAWK features integrated lighting (built-in red LEDs for monochrome sensors and white LEDs for color sensors). Depending on the requirements of your application, you may also need external lighting from Omron 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.
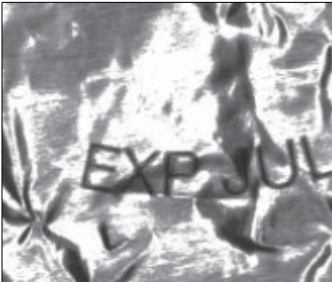
Before correct lighting
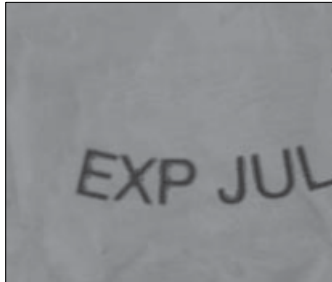
After correct lighting with a NERLITE Illuminator

MicroHAWK MV-40 External Illumination Control and Wiring

The MicroHAWK MV-40 Smart Camera supports external lighting with Omron Microscan's NERLITE Smart Series lights. The diagrams below demonstrates how the camera and light can be configured. The light is controlled using the Lighting control in the Camera configuration settings of AutoVISION software.
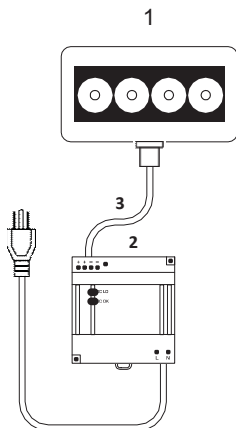
Figure A
MAX Series Illuminator
with power supply
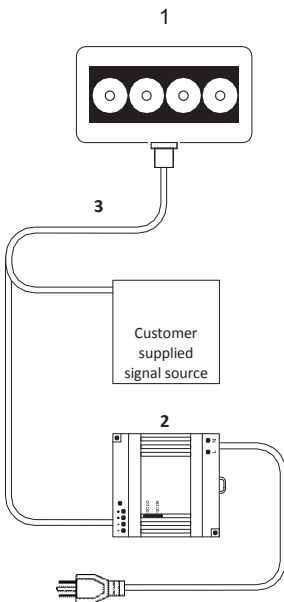
Figure B
MAX Series Illuminator with
customer supplied dimming
or on-off signal source
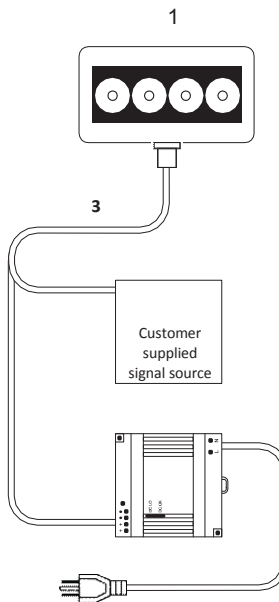
Figure C
MAX Series Illuminator
with customer supplied
strobe trigger
signal source

Item	Description	Part Number
1	MAX Series Lights	NER-011660XXXG
2	Power Supply DSP100 24VDC 4.2A DIN Mount	97-000006-01
	Power Supply DSP60 24VDC 2.5A DIN Mount	NER-011504100
3	Cable, 5P M12 Socket To Flying Leads, 3M	61-000186-01
	Cable, 5P M12 Socket To Flying Leads, 5M	61-000187-01
4	Cable, 5P M12 Plug To 5P M12 Socket, 1M	61-000184-01
	Cable, 5P M12 Plug To 5P M12 Socket, 3M	61-000185-01
5	Cable, Power Smart Series to QX-1	61-000204-01

QX-1 Interface

In Strobe mode, the external illuminator is strobed with the exposure of the camera to maximize light for the short exposure times needed in dynamic applications.

ON/OFF allows the external illuminator to be enabled and disabled using the MicroHAWK MV-40's I/O.
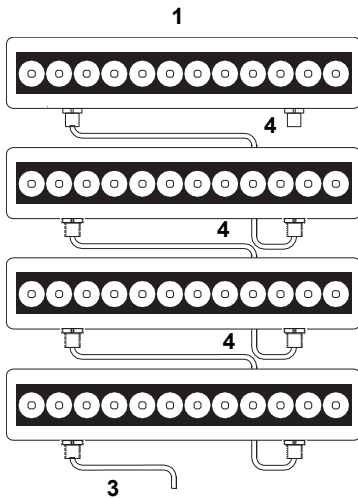
Figure D
MAX Series Illuminator in a daisy chain configuration. See figures A, B, or C for the correct power supply and signal connections for your application.
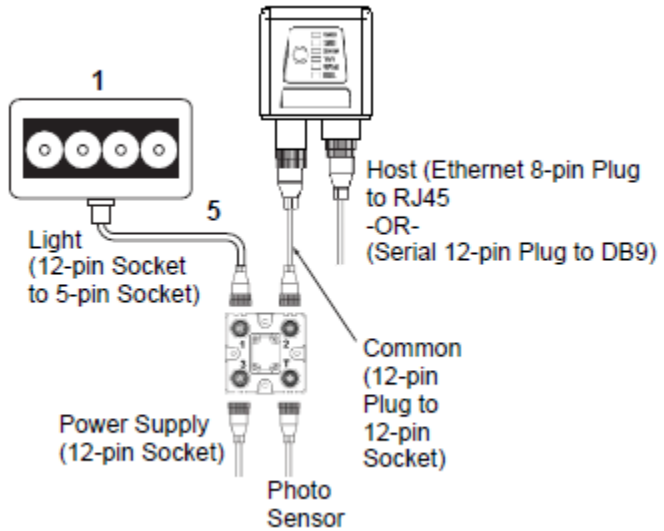
Figure E
MAX Series Illuminators with QX-1 Interface Device.
Note: Figure E is not compatible with daisy chaining. Powering more than one MAX via the QX-1 will exceed the QX-1's current capacity.

	Operation	Cable
1	Strobe	61-000218-01, Smart Series-to-QX-1, Strobe, NPN
2	ON/OFF	61-000207-01, Smart Series-to-QX-1, ON/OFF
3	Continuous ON	61-000204-01, Smart Series-to-QX-1, Continuous

Wiring for Strobe Illumination (NPN)

Warning: Contact between Pin 5 (gray wire) and any ground or voltage source less than or equal to 3.5VDC may cause erratic operation in this configuration. Contact between Pin 5 (gray wire) and any voltage source greater than 3.5VDC will damage the illuminator.

Smart Series Illuminator Connector

MicroHAWK MV-40 Connector A

Smart Series Illuminator			MicroHAWK (Connector A)	
Pin	**Signal Name**		**Pin**	**Signal Name**
1	+24VDC	to	2	Power
2	Trigger –	to	6	Output 3
3	DC Ground	to	7 and 12	Ground and Output Common
4	Trigger +	to	2	Power
5	Dim	to	No Connection*	N/A

* Insulate Pin 5 (gray wire)

Wiring for Strobe Illumination (PNP)

Warning: Contact between Pin 5 (gray wire) and any ground or voltage source less than or equal to 3.5VDC may cause erratic operation in this configuration. Contact between Pin 5 (gray wire) and any voltage source greater than 3.5VDC will damage the illuminator.

Smart Series Illuminator Connector

MicroHAWK MV-40 Connector A

Smart Series Illuminator				MicroHAWK (Connector A)	
Pin	Signal Name		Pin	Signal Name
1	+24VDC	to	2 and 12	Power and Output Common
2	Trigger –	to	7	Ground
3	DC Ground	to	7	Ground
4	Trigger +	to	6	Output 3
5	Dim	to	No Connection*	N/A

* Insulate Pin 5 (gray wire)

4

Optics and Lighting

Wiring for ON/OFF Illumination (NPN Only)

Warning: Contact between Pin 5 (gray wire) and any voltage source greater than 3.5VDC will damage the illuminator.
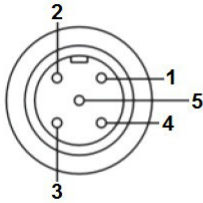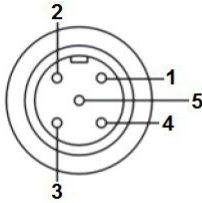
Smart Series Illuminator Connector
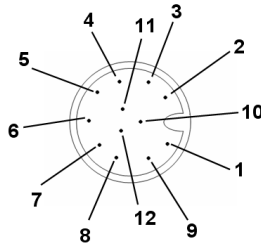
MicroHAWK MV-40 Connector A

Smart Series Illuminator	
Pin	Signal Name
1	+24VDC
2	Trigger –
3	DC Ground
4	Trigger +
5	Dim

to
to
to
to
to

MicroHAWK (Connector A)	
Pin	Signal Name
2	Power
7 and 12	Ground and Output Common
7 and 12	Ground and Output Common
2	Power
6	Output 3

* Insulate Pin 5 (gray wire)

Wiring for Continuous Illumination

Warning: Contact between Pin 5 (gray wire) and any ground or voltage source less than or equal to 3.5VDC may cause erratic operation in this configuration. Contact between Pin 5 (gray wire) and any voltage source greater than 3.5VDC will damage the illuminator.

Smart Series Illuminator Connector

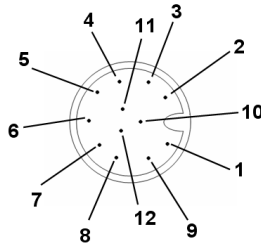*MicroHAWK MV-40 Connector A*

Smart Series Illuminator				MicroHAWK (Connector A)	
Pin	**Signal Name**		**Pin**	**Signal Name**
1	+24VDC	to	2	Power
2	Trigger –	to	7	Ground
3	DC Ground	to	7	Ground
4	Trigger +	to	2	Power
5	Dim	to	No Connection*	N/A

* Insulate Pin 5 (gray wire)

A

APPENDIX A Connector Pinouts

This section contains information about the MicroHAWK MV-20, MV-30, and MV-40 Smart Camera's connectors and pin assignments.

MV-20 Connector

Micro-USB Type B Socket
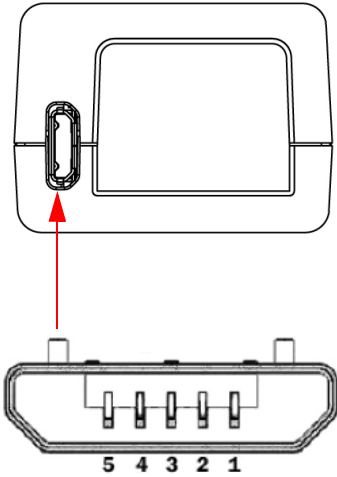
Pin	Function
1	Vbus (5V)
2	D–
3	D+
4	NC
5	Ground

MV-30 Connector

High-Density 15-Pin D-Sub Socket
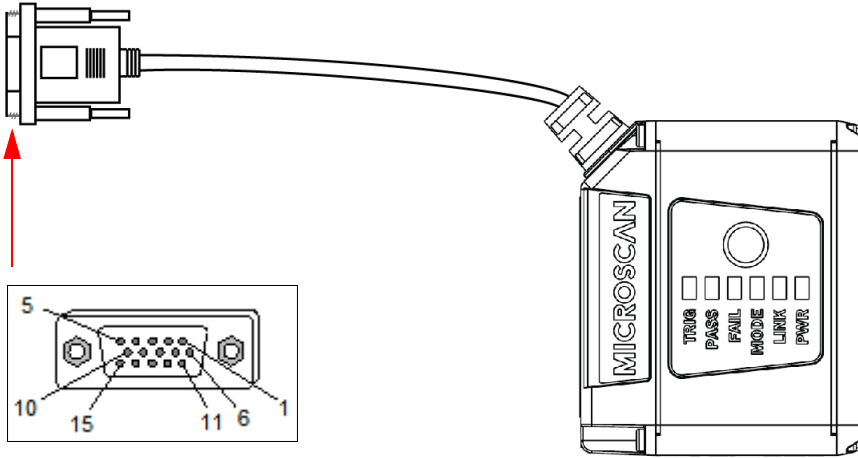
Pin	Function
1	+5VDC
2	TX232
3	RX232
4	GND
5	D+
6	N/C
7	Output 1+
8	Default+
9	Trigger+
10	D–
11	Output 3+
12	New Master+
13	N/C
14	Output 2+
15	Vbus

MV-40 Connector

Connector A – M12 12-Pin Plug – Power, I/O, and Serial
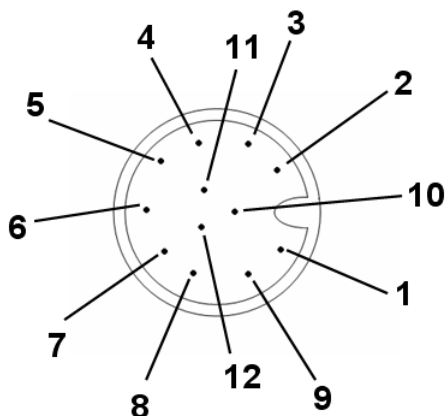
Pin	Function
1	Trigger
2	Power
3	Default
4	New Master
5	Output 1
6	Output 3
7	Ground
8	Input Common
9	RS-232 (Host) RxD
10	RS-232 (Host) TxD
11	Output 2
12	Output Common

Connector B – M12 8-Pin Socket – Ethernet
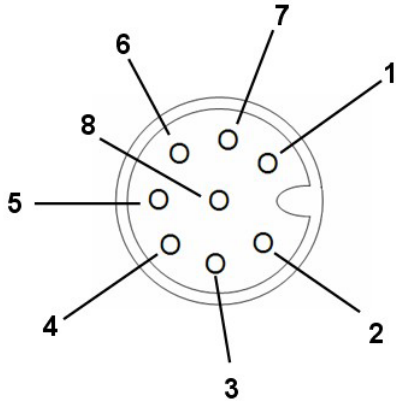
Pin	Function
1	V+
2	V–
3	V–
4	TX (–)
5	RX (+)
6	TX (+)
7	V+
8	RX (–)

Appendix **A** Connector Pinouts

B

Cable Specifications

This section contains information about cables for the MicroHAWK MV-20, MV-30, and MV-40 Smart Cameras.

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

Part Number	Description
61-9000034-01	Cable, USB A to Micro B, 6 ft., MV-20
61-9000045-01	Cable, USB A to Micro B, 3 ft., MV-20
61-9000037-01	Cable, DB15 to Ext. Power/RS-232, MV-30
61-9000038-01	Cable, DB15 to Ext. Power/USB, MV-30
61-9000039-01	Cable, DB15 to Ext. Power/USB, I/O, MV-30
61-9000043-01	Cable, DB15 to BUS Power USB, MV-30
61-9000102-01	Cable, DB15 to USB/RS-232 Triggered, MV-30
61-9000054-01	Cable, M12 12-Pin Socket to 9-Pin Socket and M12 Plug
61-9000088-01	Cable, M12 12-Pin Socket to USB Keyboard Wedge and M12 Plug

MV-20 Cables

61-9000034-01/61-9000045-01 USB Type A-to-Micro B Cable

The 61-9000034-01/61-9000045-01 Micro-USB Type B plug to USB Type A plug cable is a double-ended shielded ferrite core USB cable. 61-9000034-01 is 6 feet long, and 61-9000045-01 is 3 feet long. This cable is used for basic communications-only applications.

Micro-USB Type B Plug

Shown with optional ferrite core (98-9000035-01, Ferrite Core Snap-On Kit for USB Cable – required for Class B Emissions)

USB Type A Plug

RED	1 ——————	1
WHITE	2	2
GREEN	3	3
BLACK	5 ——————	4
SHIELD	——————	SHIELD
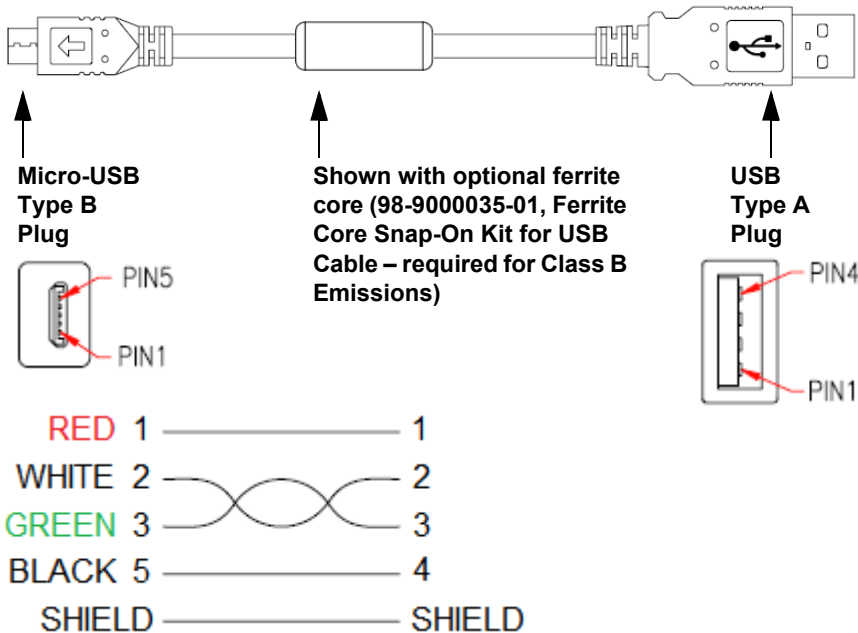
MV-30 Cables

61-9000037-01 DB15 to Ext. Power/RS-232 Cable

The 61-9000037-01 DB15 to Ext. Power/RS-232 cable is cable with one end a 9-pin D-Sub socket connector (J1) and the other end a DB15 (J3) extended Power/RS-232 (J2). This cable is used for basic communications applications that require more light or use higher-speed applications.
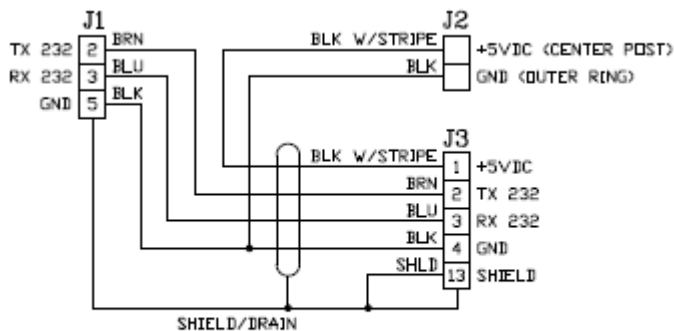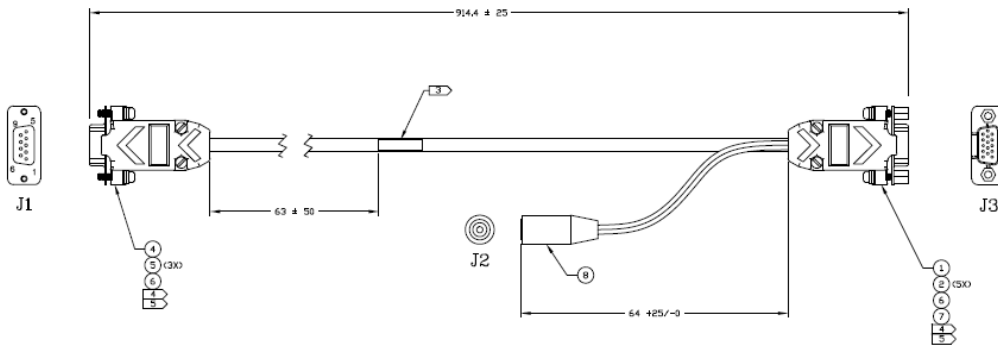
SCHEMATIC

61-9000038-01 DB15 to Ext. Power/USB Cable

The 61-9000038-01 DB15 to ext. power/USB cable is a cable with one end a USB connector(J1) and the other end a DB15 (J3) extended power/RS-232 (J2). This cable is used for basic communications applications that require more light or for higher speed applications.
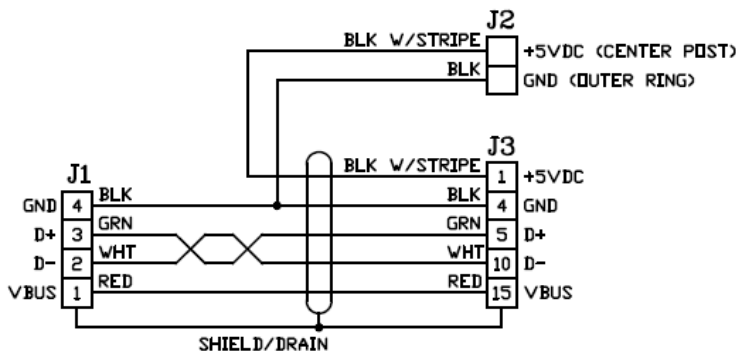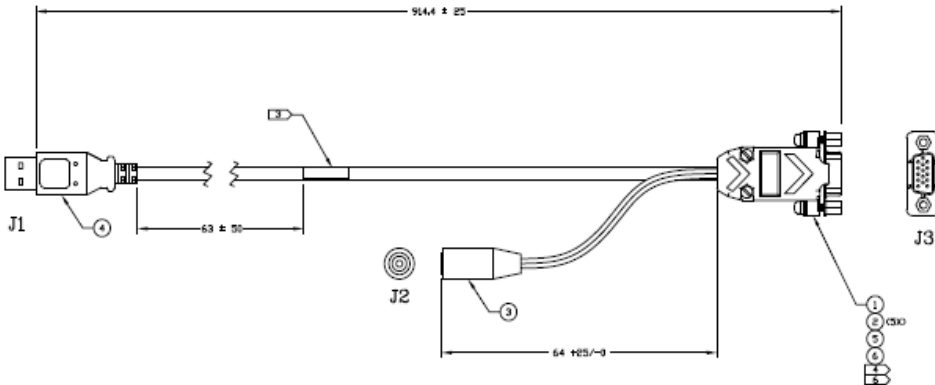
SCHEMATIC

61-9000039-01 DB15 to Ext. Power/USB, I/O Cable

The 61-9000039-01 DB15 to ext. power/USB, I/O cable is a cable with one end a 15-pin D-Sub socket connector (J1) and the other end a USB (J2) extended with a 2-pin socket (J3) and an 8-pin socket (J4) connector. This cable is used for virtual LAN or RS-232 with I/O applications, any speed with line stop or result indication.
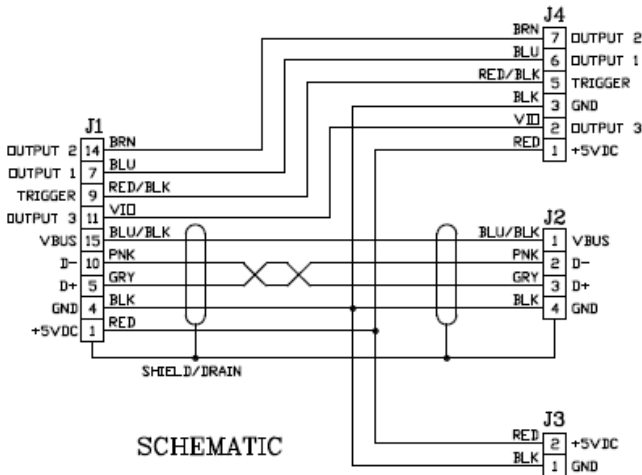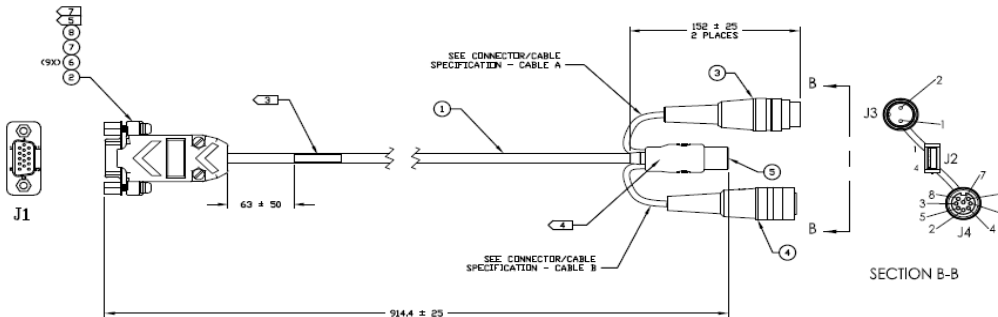
61-9000043-01 DB15 to BUS Power USB Cable

The 61-9000043-01 DB15 to bus power USB cable is a double-ended cable; one end is a 15-pin D-Sub socket (J1) and the other end is a USB plug (J2). This cable is used for basic communications applications that require more light or for higher speed applications.
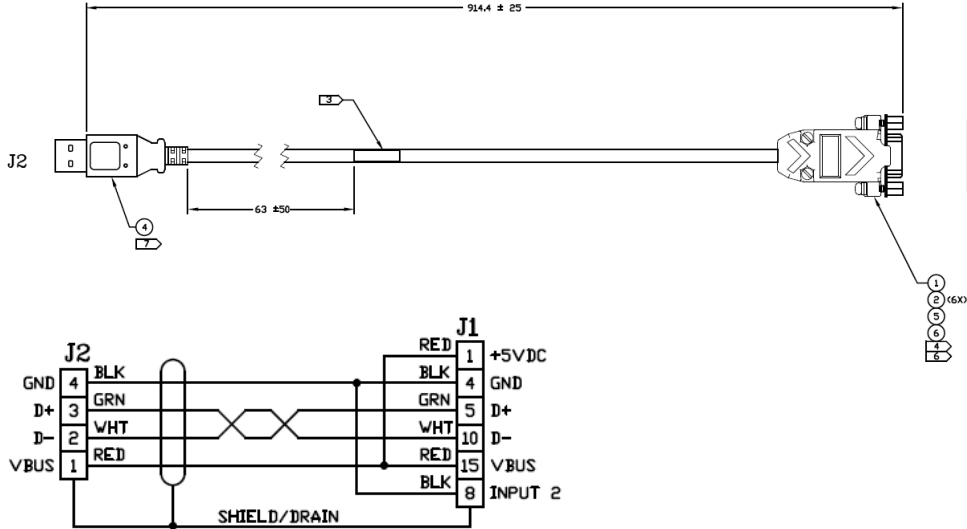
SCHEMATIC

61-9000102-01 DB15 to USB/RS-232 Triggered Cable

The 61-9000102-01 DB15 to USB/RS-232 triggered cable is a cable with one end a 9-pin (J5) and a 15-pin D-Sub socket connector (J1), and the other end a USB (J2) extended with a 2-pin socket (J3) and an 8-pin socket (J4) connector. This cable is used for RS-232 applications with I/O for line stop or result indications.
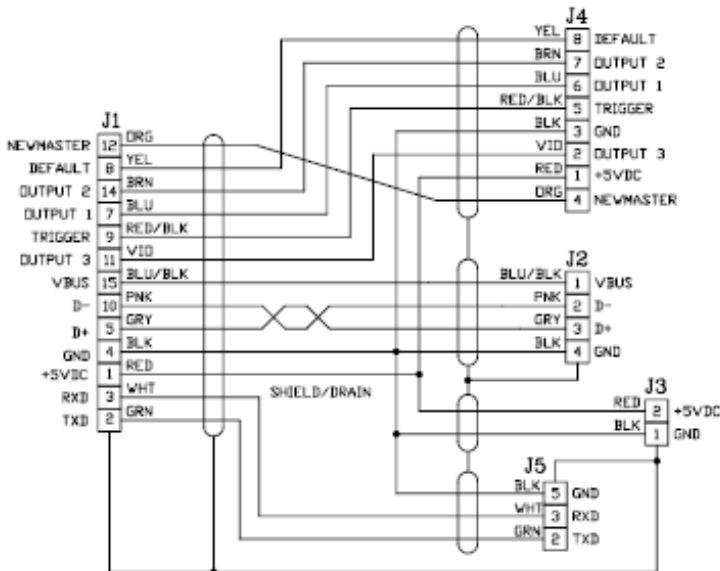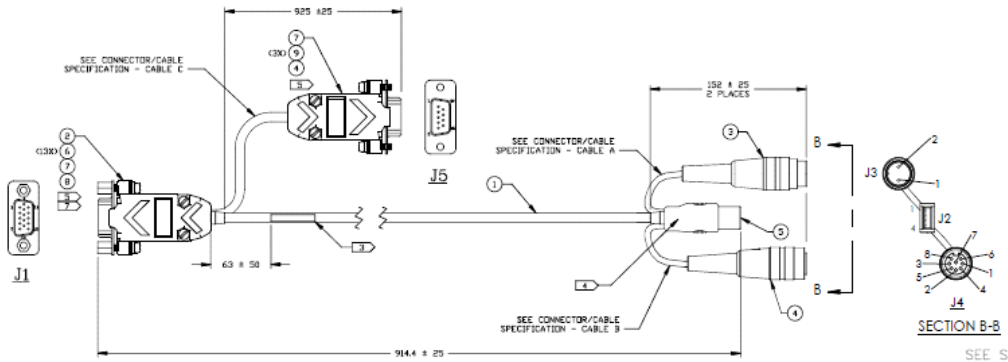
MV-40 Cables

61-9000054-01 M12 12-Pin Socket to 9-Pin Socket and M12 Plug

The 61-9000054-01 M12 12-pin socket to 9-pin socket and M12 plug cable is a cable with one end a 12-pin socket connector (J1) and the other end a 9-pin socket (J2) and an M12 plug (J3). This cable replaces common cord set, QX-1 and RS-232 cable with a single cable option. It is used for both RS-232 and WebLink simultaneously.
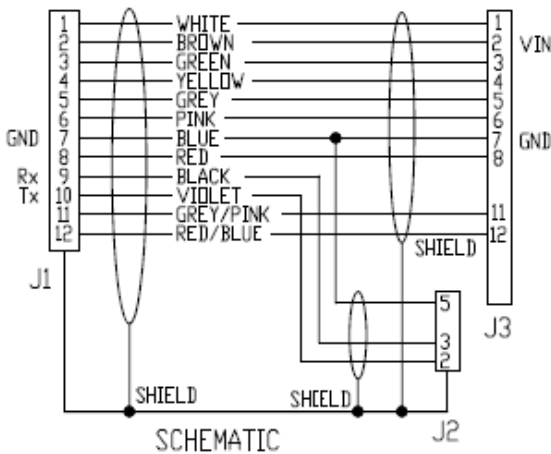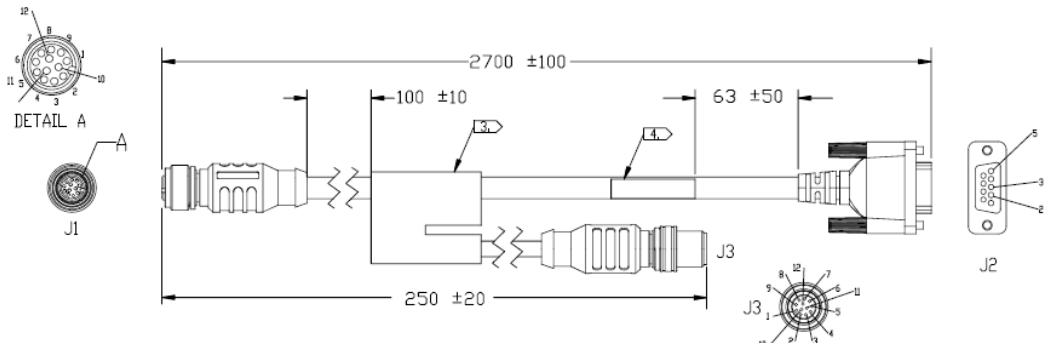
61-9000088-01 M12 12-Pin Socket to USB Keyboard Wedge and M12 Cable

The 61-9000088-01 M12 12-pin socket to USB keyboard wedge and M12 cable is a cable with one end a 12-pin socket connector (J1) and the other end a 98-9000022-01 USB keyboard wedge (9600 bps) (J2) and an M12 plug (J3). This cable is used with applications requiring keyboard input.
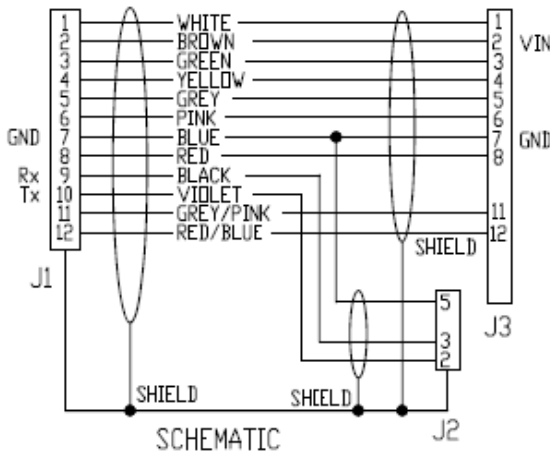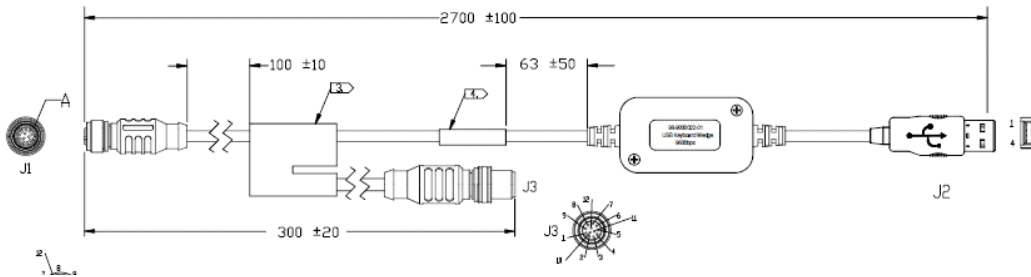
Pinouts for Cordsets with Flying Leads

Omron Microscan offers two flying lead cordsets for use in hardware configurations:
- 61-000166-02 (Plug, Screw-On)
- 61-000167-02 (Socket, Screw-On)

The diagrams below show the correspondence of wire colors to pins.

61-000166-02 – M12 12-Pin Plug to Flying Leads

61-000166-02 connects to Connector B (Serial) and QX-1 Connector 2.

Pin	Color
1	WHITE
2	BROWN
3	GREEN
4	YELLOW
5	GREY
6	PINK
7	BLUE
8	RED
9	BLACK
10	VIOLET
11	GREY-PINK
12	RED-BLUE
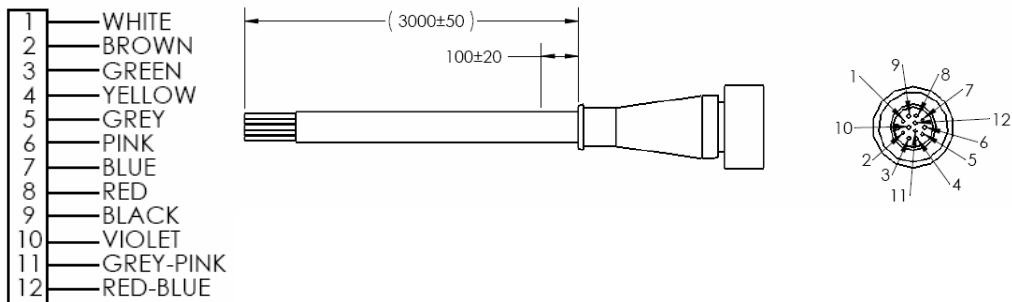
61-000167-02 – Cordset, M12 12-Pin Socket to Flying Leads

61-000167-02 connects to Connector A and QX-1 Connectors 1 and 3.

Pin	Color
1	WHITE
2	BROWN
3	GREEN
4	YELLOW
5	GREY
6	PINK
7	BLUE
8	RED
9	BLACK
10	VIOLET
11	GREY-PINK
12	RED-BLUE
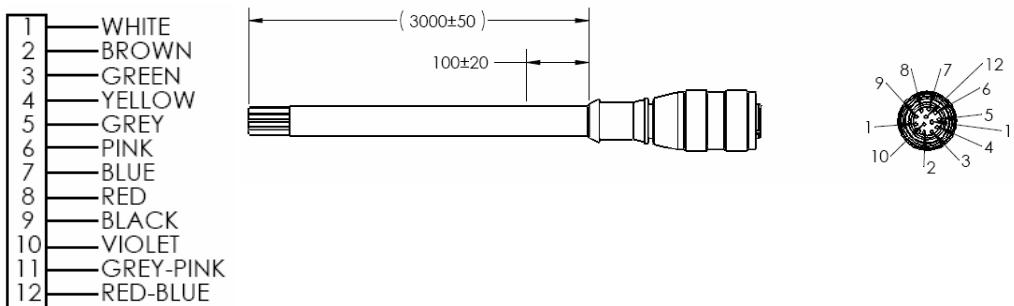
General Specifications

This section contains specifications for the MicroHAWK MV-20, MV-30, and MV-40 Smart Cameras.

MicroHAWK MV-20 General Specifications

MV-20 Dimensions, Enclosure

Dimensions	Enclosure
Height: 24 mm (0.94") **Width:** 34 mm (1.34") **Length:** 39 mm (1.54") **Weight:** 26 g (0.92 oz.)	IP40, Plastic

MV-20 Environmental, Emissions

Operating Temperature	Storage Temperature	Humidity	Emissions
0° to 40° C (32° to 104° F)	-50° to 75° C (-58° to 167° F)	5% to 95% (non-condensing)	EN 61326-1:2013 Class B Limits

MV-20 Electrical

Electrical
5 VDC ± 5%, 350 mA at 5 VDC (typ.)

MV-20 Connector, Communication, Illumination, Indicators

Connector	Communication	Illumination	Indicators
Micro-B USB	USB 2.0 High-Speed (Ethernet over USB and HD)	**Inner Red:** 4 LEDs, 625 nm nominal **Inner White:** 4 LEDs **Light Modes:** Off, On, Strobe	Power LED, 2 Target Pattern LEDs, 2 Inspection Passed Green Flash LEDs

MV-20 Speed, Memory, Software, FTP Image Storage

Speed	Memory	Software	FTP Image Storage
400 MHz	2 GB Non-Volatile Flash, 256 MB RAM	AutoVISION Sensor, AutoVISION, Visionscape	Supported

MV-20 Sensor Options, Exposure Time, Shutter, Frames per Second

Sensor Options	Exposure Time	Shutter	Frames per Second
WVGA (Mono): CMOS 0.34 MP (752 x 480), 4.51 x 2.88 mm, 6 µm pixel size	**WVGA:** 50 to 66,667 µs	Global	**WVGA:** Up to 52
SXGA (Mono): CMOS 1.2 MP (1280 x 960), 4.80 x 3.60 mm, 3.75 µm pixel size	**SXGA:** 66 to 58,825 µs		**SXGA:** Up to 40
QSXGA (Color): CMOS 5 MP (2592 x 1944), 4.536 x 3.402 mm, 1.75 µm pixel size	**QSXGA:** 66 to 66,667 µs	Rolling	**QSXGA:** Up to 5

MV-20 Optics, Focus

Optics	Focus
Standard Density (SD): 5.2 mm	**SD, HD:** Factory set to 50, 102, 190, or 300 mm
High Density (HD): 8.0 mm	
Ultra-High Density (UHD): 16.0 mm	**UHD:** Factory set to 64 or 400 mm

MicroHAWK MV-30 General Specifications

MV-30 Dimensions, Enclosure

Dimensions	Enclosure
Height: 25 mm (0.98") **Width:** 45 mm (1.77") **Length:** 38 mm (1.50") **Weight without Cable:** 46 g (1.62 oz.)	IP54, Aluminum

MV-30 Environmental, Emissions

Operating Temperature	Storage Temperature	Humidity	Emissions
0° to 40° C (32° to 104° F)	-50° to 75° C (-58° to 167° F)	5% to 95% (non-condensing)	EN 61326-1:2013 Class A Limits

MV-30 Electrical

Electrical
5 VDC ± 5%, 600 mA at 5 VDC (typ.)

MV-30 Connector, Communication, Discrete I/O, Illumination, Indicators

Connector	Comm.	Discrete I/O	Illumination	Indicators
0.91 m Cable with High-Density 15-Pin D-Sub Socket	USB 2.0 Full-Speed (Ethernet over USB and HID), RS-232	**2 in/3 out:** Trigger Input; New Master Input: 5-28 V-rated (0.16 mA @ 5 VDC); Strobe Output; 2 General Purpose Outputs: 5V TTL-compatible, can sink 10 mA and source 10 mA	**Inner Red:** 4 LEDs, 625 nm nominal **Inner White:** 4 LEDs **Outer Red, White, Blue, or IR:** 8 LEDs **Light Modes:** Inner or Outer; Off, On, Strobe, Power Strobe; Power Strobe for Outer LEDs only. Not available when running under USB power.	TRIG, PASS, FAIL, MODE, LINK, PWR LEDs, 2 Target Pattern LEDs, 2 Inspection Passed Green Flash LEDs

MV-30 Memory, Speed, Software, FTP Image Storage

Memory	Speed	Software	FTP Image Storage
2 GB Non-Volatile Flash, 256 MB RAM	800 MHz	AutoVISION Sensor, AutoVISION, Visionscape	Supported

MV-30 Sensor Options, Shutter, Exposure Time, Frames per Second

Sensor Options	Shutter	Exposure Time	Frames per Second
WVGA (Mono): CMOS 0.34 MP (752 x 480), 4.51 x 2.88 mm, 6 µm pixel size	Global	**WVGA:** 50 to 66,667 µs	**WVGA:** Up to 52
SXGA (Mono): CMOS 1.2 MP (1280 x 960), 4.80 x 3.60 mm, 3.75 µm pixel size		**SXGA:** 66 to 58,825 µs	**SXGA:** Up to 40
QSXGA (Color): CMOS 5 MP (2592 x 1944), 4.536 x 3.402 mm, 1.75 µm pixel size	Rolling	**QSXGA:** 66 to 66,667 µs	**QSXGA:** Up to 5

MV-30 Optics, Focus

Optics	Focus
Fixed: Standard Density (5.2 mm); High-Density (8.0 mm); Ultra-High-Density (16.0 mm)	**Fixed:** SD, HD: Factory set to 50, 102, 190, or 300 mm; UHD: 64 or 400 mm
Autofocus: Standard Density (5.2 mm); High-Density (7.7 mm); Ultra-High-Density (16.0 mm); Long Range (16.5 mm Focal Length)	**Autofocus:** SD, HD: Software-adjustable 50 to 300 mm; UHD: 40 to 150 mm; Long Range: 75-1,160 mm Autofocus Distance)

MicroHAWK MV-40 General Specifications

MV-40 Dimensions, Enclosure

Dimensions	Enclosure
Height: 25 mm (0.98") **Width:** 45 mm (1.77") **Length:** 45 mm (1.77") **Weight:** 68 g (2.40 oz.)	IP65/67, Aluminum

MV-40 Environmental, Emissions

Operating Temperature	Storage Temperature	Humidity	Emissions
0° to 45° C (32° to 113° F)	-50° to 75° C (-58° to 167° F)	5% to 95% (non-condensing)	EN 61326-1:2013 Class B Limits

MV-40 Electrical

Electrical
4.75-30 VDC, 200 mV p-p max ripple, 150 mA at 24 VDC (typ.)

MV-40 Connector, Communication, Discrete I/O, Illumination, Indicators

Connector	Passive PoE	Comm.	Discrete I/O	Illumination	Indicators
M12 12-Pin Power, M12 8-Pin Ethernet	24 V Passive Power over Ethernet, Type B; Requires passive PoE power supply	RS-232, Ethernet TCP/IP, EtherNet/IP, PROFINET I/O	**2 in/3 out:** Optoisolated Trigger Input; New Master Input: Bi-directional, Optoisolated, 1-28 V-rated (10 mA @ 28 VDC); Strobe Output, 2 General Purpose Outputs: Bi-directional, Optoisolated, 1-28 V-rated (I_{CE} < 100 mA @ 24 VDC, current limited by user)	**Inner Red:** 4 LEDs, 625 nm nominal **Inner White:** 4 LEDs **Outer Red, White, Blue, or IR:** 8 LEDs **Light Modes:** Inner or Outer; Off, On, Strobe, Power Strobe; Power Strobe for Outer LEDs only	TRIG, PASS, FAIL, MODE, LINK, PWR LEDs, 2 Target Pattern LEDs, 2 Inspection Passed Green Flash LEDs

MV-40 Speed, Memory, Software, FTP Image Storage

Speed	Memory	Software	FTP Image Storage
800 MHz	2 GB Non-Volatile Flash, 256 MB RAM	AutoVISION Sensor, AutoVISION, Visionscape	Supported

MV-40 Sensor Options, Shutter, Exposure Time, Frames per Second

Sensor Options	Shutter	Exposure Time	Frames per Second
WVGA (Mono): CMOS 0.34 MP (752 x 480), 4.51 x 2.88 mm, 6 µm pixel size	Global	**WVGA:** 50 to 66,667 µs	**WVGA:** Up to 52
SXGA (Mono): CMOS 1.2 MP (1280 x 960), 4.80 x 3.60 mm, 3.75 µm pixel size		**SXGA:** 66 to 58,825 µs	**SXGA:** Up to 40
QSXGA (Color): CMOS 5 MP (2592 x 1944), 4.536 x 3.402 mm, 1.75 µm pixel size	Rolling	**QSXGA:** 66 to 66,667 µs	**QSXGA:** Up to 5

MV-40 Optics, Focus

Optics	Focus
Fixed: Standard Density (5.2 mm); High-Density (8.0 mm); Ultra-High-Density (16.0 mm)	**Fixed:** SD, HD: Factory set to 50, 102, 190, or 300 mm; UHD: 64 or 400 mm
Autofocus: Standard Density (5.2 mm); High-Density (7.7 mm); Ultra-High-Density (16.0 mm); Long Range (16.5 mm Focal Length)	**Autofocus:** SD, HD: Software-adjustable 50 to 300 mm; UHD: 40 to 150 mm; Long Range: 75-1,160 mm Autofocus Distance)

D

APPENDIX D Serial Commands

Serial commands can be sent via **TCP port**, **AutoVISION Terminal**, or **HyperTerminal**.

Important: The HAWK MV-4000 Smart Camera does not support any focus commands.

Serial Commands

Serial Command Syntax

< > = Required argument. Replace appropriately.

For example:

-u <DB_User_name> becomes **-u av** where **av** replaces **DB_User_name**.

| = Mutually exclusive arguments. Choose one from the list.

{ } = Used with **|** to specify a list of choices for an argument.

[ ] = Optional parameter.

Important: Unless otherwise stated, commands will respond with **!OK** on success and **!ERROR** on failure.

AUTOCAL [-exp={0|1}] [-expval={60-100000}] [-gain={0|1}] [-gainval ={0-100}] [-focus={0|1}] [-focval{0-9999}]

Initiates camera calibration of gain, exposure, and focus. Each parameter is independent. Ranges are device-dependent.

-exp enable=1 or **disable=0** autocalibrate exposure.

-expval value of exposure in μs.

-gain enable=1 or **disable=0** autocalibrate gain.

-gainval value of gain in percentage.

-focus enable=1 or **disable=0** autocalibrate focus

-focval value of focus in mm.

Example 1:

Command: AUTOCAL

Response: 0;4632;134;50;300 (gain=0, exposure=4632 μs, focus=134, min allowable focus=50, max allowable focus=300)

Example 2:

Command: OFFLINE

Response: !OK

Command: QUERYAUTOCAL

Response: 0;4632;134;50;300 (Gain was 0.)

Command: AUTOCAL -exp=1 -gain=0 -gainval=18 (Fixed gain at 18%.)

Response: 18;3308;128;50;300 (Gain did not change and exposure has changed from 4632 μs to 3308 μs.)

Example 3:

Command: OFFLINE

Response: !OK

Command: QUERYAUTOCAL

Response: 0;3478;226;50;300 (Exposure was 3478 μs.)

Command: AUTOCAL -exp=0 -expval=1000 (Fixed exposure at 1000 μs.)

Response: 31;1000;98;50;300 (Exposure stayed at 1000 μs and gain has changed from 0% to 31%.)

Important: AUTOCAL only functions when the camera is OFFLINE.

GET {tagname|service|service.tagname}

Gets value of a global tag.

The tagname must correspond to one of the supported tags within the device. Use the **INFO** command to get a full list of tags and services, as well as attributes of the tag and list of subtags.

The command is terminated by a carriage return and/or line feed character.

Include an index to get a single value from an array such as **GET int1**. If the index is omitted, the full array of values will be returned in a comma-separated list of values.

Send **Get {tagname|service.tagname|service}** to get the value of a tag within the global data service. To get the value of a tag within another service, prefix the tagname with the service name. For example, a **GET <service.tagname>** command such as **GET eip.input** for the EIP input assembly.

The AVP service allows retrieval of step and datum information from the job tree using forward slash '/' in the symbolic name path. **GET avp/insp1/snapshot1/status** paths are not case-sensitive and do not need to be fully qualified if unique.

GET avp/snapshot1/status will return the same result if there is only one inspection.

When issued against a step, **GET avp/snapshot1** will return the values for all datums.

Success Return: On success will return the value stored in the tag.

For example: ABCD

Fail Return: On failure will return !ERROR followed by the reason for the failure.

For example: !ERROR Tag matchstring66 not found

Important: This command only functions when the camera is ONLINE.

GETIMAGE <-transfer=ymodem> [-format={jpg|png|tif|raw|bmp}] [-quality ={0-100}] [-woi=left,top,right,bottom] [-inspection=n]

Initiates serial transfer of inspection image.

Note: This command always returns the last (most recent) image.

Important: JOBDOWNLOAD only supports FTP on the HAWK MV-4000.

-transfer=ymodem is currently not optional - only Ymodem protocol is supported.

-format={jpg|png|raw|tif|bmp} specifies the format of the image. If omitted, the image format is JPG.

Note: For monochrome cameras, the only formats available are TIF, PNG, and JPG. For color cameras, the only formats available are RAW, PNG, and BMP.

Note: If BMP is selected, the system will return a PNG file.

Note: All image file types return complete file information that can be saved directly to disk except the RAW file type, which requires explicit conversion.

-quality=*n* specifies a JPG compression quality of *n* less than or equal to 100. The default quality is 80 if not specified. This setting is only supported for the JPG file type.

Note: PNG, **RAW**, **TIF**, and **BMP** formats provide lossless image compression. If **format** is set to **PNG**, **RAW**, **TIF**, or **BMP**, the **quality** setting does not apply.

woi=left,top,right,bottom specifies a rectangular area of the image to be included in the output image. If omitted, the full image buffer is returned.

-inspection=*n* specifies the inspection from which to retrieve an image. The image will be from the first snapshot within that inspection. If not specified, the image will be from the first inspection that contains a snapshot.

The following example will retrieve an image from the camera with these settings: **Protocol:** ymodem; **Format:** png; **Quality:** N/A; **Inspection:** second inspection.

GETIMAGE –transfer=ymodem –format=png –inspection=2

The following example will retrieve an image from the camera with these settings: **Protocol:** ymodem; **Format:** jpg (default); **Quality:** 50; **Inspection:** first inspection (default).

GETIMAGE –transfer=ymodem –quality=50

Important: This command only functions when the camera is ONLINE.

HELP

Returns a list of all serial commands showing correct syntax and functionality descriptions.

INFO [tagname|service]

Gets information about a tag or service.

INFO with no arguments gets a list of services.

INFO <service> gets a list of tags in that service.

INFO <service.tagname> gets attributes of the tag as well as a list of subtags.

The AVP service allows retrieval of step and datum information from the job tree using forward slash '*/*' in the symbolic name path. **INFO avp/insp1/snapshot1/status** paths are not case-sensitive and do not need to be fully qualified if unique.

INFO avp/snapshot1/status will return the same result if there is only one inspection.

When issued against a step, **INFO avp/snapshot1** returns properties of the step, a list of child datums, and a list of child steps. Child steps are indicated by a trailing forward slash.

JOBBOOT [-slot=]<n>

Sets bootup job slot *n* (RS-232 only).

JOBDELETE {[-slot=]n|-all}

Deletes job in slot *n*, or all jobs if **-all**.

Important: Does not delete the current job loaded in camera memory.

JOBDOWNLOAD <-transfer={ymodem|ftp}> [-size=value] [-c]

Important: JOBDOWNLOAD only supports FTP on the HAWK MV-4000, as with the GETIMAGE command.

Downloads a **.avz** job file via the specified transfer method (ymodem supported only over RS-232; FTP supported only over network connection).

The **ymodem transfer method** only requires that the user send the .avz file via the ymodem protocol over RS-232, and the job will load automatically after the transfer is complete.

The **FTP transfer method** requires the user to perform the following steps to load the job:

- **JOBDOWNLOAD: -transfer=ftp [-size=avpsizeinbytes]**

Pre-creates a fixed-size /streamd0 RAMdisk to receive the .avz over FTP. If size is omitted, the default RAM disk size is used to create /streamd0. The size of /streamd0 is limited to (available contiguous RAM – minimum target contiguous RAM) / 2.

- User FTPs the job to /streamd0
- **JOBLOAD: -mem -r**

Loads .avz from /streamd0 into RAM, deletes the RAMDisk /streamd0, and optionally starts the job (if -r is specified).

JOBINFO [[-slot=]n] [-v]

Gets job summary or info about slot *n*.

JOBINFO with no arguments returns a list of all jobs on the device.

-v = Verbose *n*. This option shows the amount of space that would be freed if the job were deleted. It also lists the total disk space and free disk space.

JOBLOAD {[-slot=]<n>|-mem} [-r]

Loads a job from slot *n* or from memory when used with the JOBDOWNLOAD command via FTP.

-r = Start inspections.

JOBSAVE [-slot=]<n>

Saves current job to slot *n.*

MEMAVAIL [-cp]

Returns available memory for device or coprocessor.

MEMCONTIG [-cp]

Returns maximum memory block for device or coprocessor.

MEMFRAGS [-cp]

Returns memory fragments for device or coprocessor.

Important: MEMFRAGS is not supported by the HAWK MV-4000. It will return **!ERROR**.

MEMINFO [-cp] [-v]

Returns memory summary "avail/contig/frags" for device or coprocessor. Verbose.

OFFLINE

Stops all inspections.

ONLINE

Starts all inspections.

ONLINE? [-insp=n]

Queries if each inspection on the camera is online. Defaults to all inspections if no inspection is specified. If the camera is running in a multi-inspection job, this command will return **!1** if all inspections are online and **!0** otherwise.

-insp=n specifies the inspection to query if it is online.

QUERYAUTOCAL

Returns photometry settings: Gain, Exposure, and Focus.

QUERYFOCUSUNITS

Queries the units being used for autofocus, mm (0) or inches (1).

QUERYWHITEBAL

Returns white balance settings: RED gain, BLUE gain, and GREEN gain.

QUICKFOCUS [x] [y]

Performs an autofocus by analyzing the area around the point specified by **x** and **y**. The response is in the format of the camera's current focus, min. allowable focus on the camera, max. allowable focus on the camera.

Example:

Perform a quick focus on point (640,480) in the image.

Command: QUICKFOCUS 640 480

Response: 124;50;300 (Current focus is set to 124 mm with an allowable focus range of 50 – 300 mm on the current camera.)

Important: This command only functions when the camera is OFFLINE.

READY? [-insp=n]

Queries if inspection is waiting for a trigger. **!1** if all inspections are ready or **!0** if not all inspections are ready.

-insp=n specifies the inspection to query if it is ready.

REBOOT [-noload]

Reboots the device.

-noload = do not load BOOT job.

RESTOREWBAL

Restores preset white balance parameters: RED gain, BLUE gain, and GREEN gain.

SET <tagname> <value>

Sets value of a global tag.

The tagname must correspond to one of the supported tags within the device. Use the **INFO** command to get a full list of tags and services, as well as attributes of the tag and list of subtags.

The value can contain spaces.

The command is terminated by a carriage return and/or line feed character.

The value can be a list of comma-separated items to set a sequence of tags:

Send **SET int1 1, 2, 3** to set int1 = 1, int2 = 2, int3 = 3.

The AVP service allows setting of step and datum information from the job tree using forward slash '/' in the symbolic name path. **SET avp/insp1/snapshot1/acq1/gain 2.0** paths are not case-sensitive and do not need to be fully qualified if unique.

SET avp/acq1/gain 2.0 will set the same gain value if there is only one acquire.

Control tags in the AVP service such as **START**, **STOP**, and **TRIGGER** act as momentary switches. **SET avp.start 1** is equivalent to the **ONLINE** command. **avp.start** will reset immediately and always read as **0**.

Success Return: On success will return **!OK** followed by an echo of the command.

For example:

!OK SET matchstring1

Fail Return: On failure will return **!ERROR** followed by the reason for the failure.

For example:

!ERROR Tag matchstring66 not found

SETFOCUSUNITS

Sets units used for autofocus, **mm (0)** or **inches (1)**.

Important: The MicroHAWK MV-40 only supports mm so SETFOCUSUNITS will only accept **0** and anything else will respond with **!ERROR**.

TARGET {0|1|off|on}

Turns targeting LEDs On or Off.

target 1 = Turn Target On

target 0 = Turn Target Off

TRIGGER

Triggers an inspection.

VERSION

Returns Visionscape software version.

vt [n]

Triggers an inspection by pulsing a Virtual I/O point.

For example: **vt 1**

will return pulse **VIO1**. The inspection will run if it is configured to use **VIO 1** as a trigger.

If specified, the VIO index must be in the allowed range for Virtual I/O points within Visionscape. The virtual I/O line will be set high then low.

If VIO Index is not specified, VIO1 is assumed.

Fail Return: Return **!ERROR** followed by the reason for the failure.

For example: **!ERROR No such trigger** when the index specified '**n**' is out of range of virtual triggers.

WHITEBAL

Performs automatic calibration of white balance settings: RED gain, BLUE gain, and GREEN gain.

**Important:** This command only functions when the camera is OFFLINE.

E

USB Power Management (MV-20 and MV-30)

When your PC enters "sleep mode", the USB ports may shut down and the camera may be disconnected. This section describes how to keep your PC's USB ports active if the PC enters sleep mode or other low-power modes.
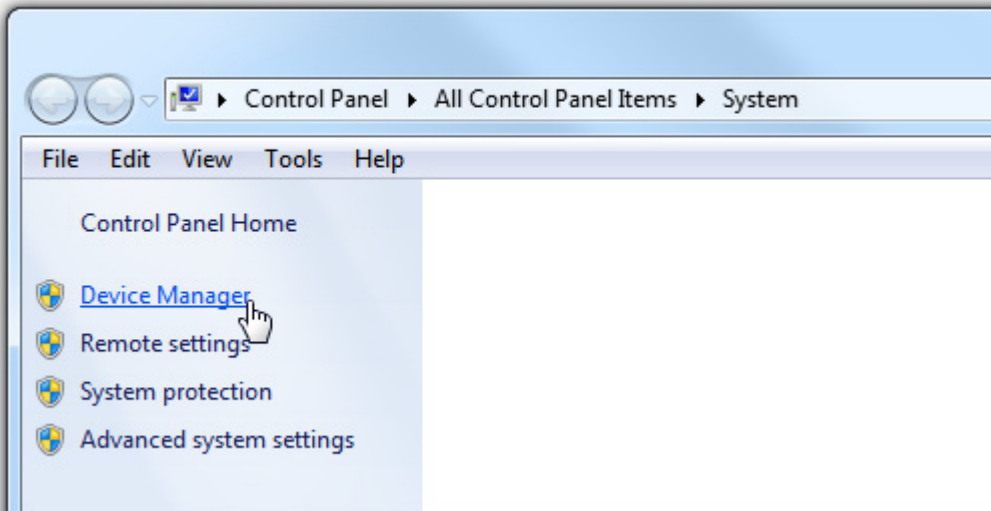
USB Root Hub Power Management

Perform the following procedure to ensure that your PC does not shut down the USB connection to your MicroHAWK MV-20, MV-30, or MV-40.
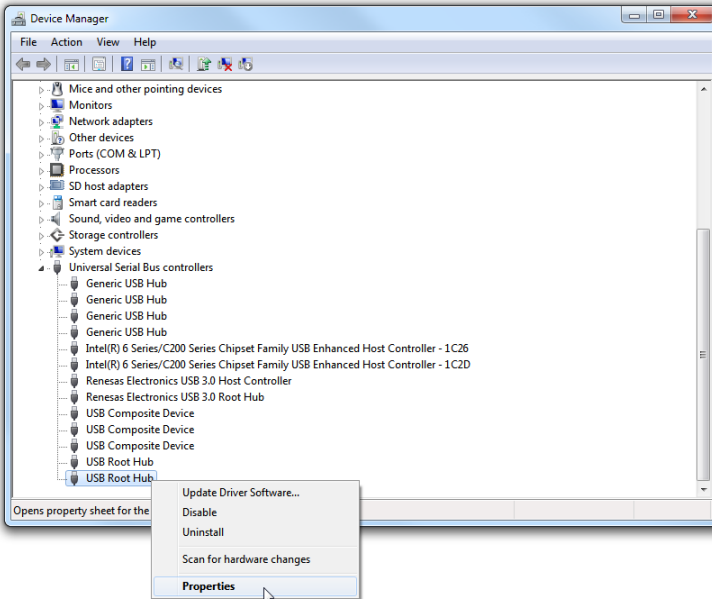
**1.** From the Windows **Start** menu, right-click on **Computer** and select **Properties**.
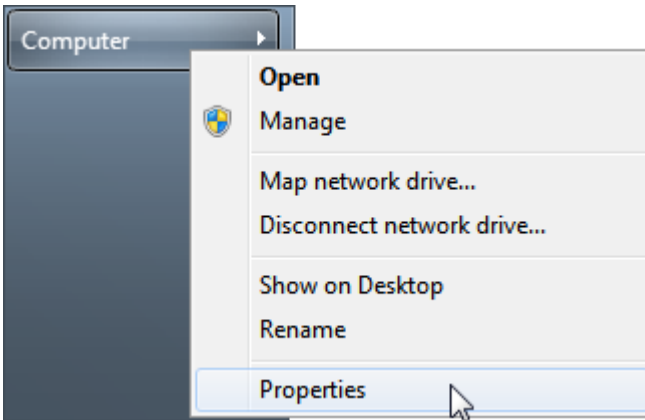
2. Select **Device Manager** from the options at the left side of the screen.

3. In the Device Manager, locate and expand the **Universal Serial Bus controllers** item. Right-click on **USB Root Hub** and select **Properties**.

4. In the **USB Root Hub Properties** dialog, select the **Power Management** tab. Un-check the box next to **Allow the computer to turn off this device to save power**. Repeat steps **3** and **4** for each **USB Root Hub** item in the **Universal Serial Bus controllers** list.

Appendix **E** USB Power Management (MV-20 and MV-30)

F
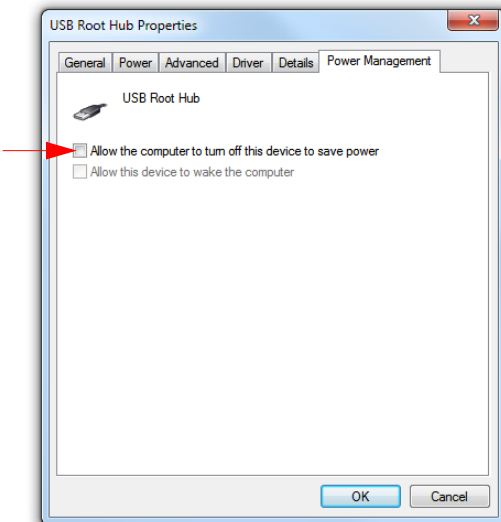
APPENDIX F TCP/UDP and General Port Usage

This section lists the ports used by MicroHAWK Smart Cameras for communication.

MicroHAWK Ports

The following table lists the ports used by MicroHAWK Smart Cameras for communication.

Port Number	Protocol	Name
49059	TCP	RPC
49049	TCP	I/O
49050	TCP	PIC/LIVE
49200	TCP	REPORT
49202	TCP	REPORTCONTROL
49201	TCP	PARTQ
49079	TCP	KEEPALIVE
49211	TCP	Serial TCP#1
49212	TCP	Serial TCP#2
49213	TCP	Serial TCP#3
49214	TCP	Serial TCP#4
49497	UDP	UDP BROADCAST
49496	UDP	UDP COMMAND
21	TCP	FTP
23	TCP	TELNET
80	TCP	HTTP