AV7000

PRODUCT REFERENCE GUIDE

Linear Camera

DATALOGIC

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Software Version

Software version 5.7. This version of software is compatible with all versions of hardware.

Patents

This product is covered by one or more of the following patents: Utility patents: Utility patents: EP2126781B1, EP2212827B1, EP2281264B1, EP2517148B1, EP2649555B1, EP2675737B1, EP2798573B1, EP3098757B1, IT1403978, JP5154574B2, US10161742, US10699091, US8308070, US8360318, US8888003, US8915443, US9230142, US9247218, US9298959, US9589165, US9785817, US9798948, US9818197, US9870498, ZL200680056899.2, ZL200980163411.X, ZL201080071124.9, ZL201280008935.3

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PREFACE

ABOUT THIS MANUAL

This Product Reference Guide (PRG) is provided for users seeking advanced technical information, including connection, programming, maintenance and specifications. The Quick Reference Guide (QRG) and other publications associated with this product can be downloaded free of charge from the Datalogic website listed on the back cover of this manual.

MANUAL CONVENTIONS

The following conventions are used in this document: This symbols listed below are used in the manual to notify the reader of key issues or procedures that must be observed when using the camera.

NOTE: This symbol draws attention to details or procedures that may be useful in improving, maintaining, or enhancing the performance of the hardware or software being discussed.

WARNING: This symbol identifies a hazard or procedure that, if incorrectly performed, could cause personal injury or result in equipment damage. It is also used to bring the user's attention to details that are considered IMPORTANT.

HIGH VOLTAGE: This symbol alerts the user they are about to perform an action involving, either a dangerous level of voltage, or to warn against an action that could result in damage to devices or electrical shock.

LASER CAUTION: This symbol alerts the user they are about to perform an action involving possible exposure to laser light radiation.

ESD CAUTION: This symbol identifies a procedure that requires you take measures to prevent Electrostatic Discharge (ESD) e.g., use an ESD wrist strap. Circuit boards are most at risk. Please follow ESD procedures.

SUPPORT THROUGH THE WEBSITE

Datalogic provides several services as well as technical support through its website. Log on to **www.datalogic.com.**

For quick access, from the home page click on the search icon , and type in the name of the product you're looking for. This allows you access to download Data Sheets, Manuals, Software & Utilities, and Drawings.

Hover over the Support & Service menu for access to Services and Technical Support.

REFERENCE DOCUMENTATION

The documentation related to the AV7000 camera system management is listed below:

- S60 Series Instruction Manual
- AS1 Series Instruction Manual
- DM3610 Reference Manual
- LCC 75XX Light Curtain Instruction Manual
- DK502 Distance Kit Instruction Manual
- PGD100 Non-Contact Speed Detector Installation Manual
- PWR-480B Installation Manual

WARRANTY

Datalogic warrants that the Products shall be free from defects in materials and workmanship under normal and proper use during the Warranty Period. Products are sold on the basis of specifications applicable at the time of manufacture and Datalogic has no obligation to modify or update Products once sold. The Warranty Period shall be **two years** from the date of shipment by Datalogic, unless otherwise agreed in an applicable writing by Datalogic.

Datalogic will not be liable under the warranty if the Product has been exposed or subjected to any: (1) maintenance, repair, installation, handling, packaging, transportation, storage, operation or use that is improper or otherwise not in compliance with Datalogic's instruction; (2) Product alteration, modification or repair by anyone other than Datalogic or those specifically authorized by Datalogic; (3) accident, contamination, foreign object damage, abuse, neglect or negligence after shipment to Buyer; (4) damage caused by failure of a Datalogic-supplied product not under warranty or by any hardware or software not supplied by Datalogic; (5)any device on which the warranty void seal has been altered, tampered with, or is missing; (6) any defect or damage caused by natural or man-made disaster such as but not limited to fire, water damage, floods, other natural disasters, vandalism or abusive events that would cause internal and external component damage or destruction of the whole unit, consumable items; (7) use of counterfeit or replacement parts that are neither manufactured nor approved by Datalogic for use in Datalogic-manufactured Products; (8) any damage or malfunctioning caused by non-restoring action as for example firmware or software upgrades, software or hardware reconfigurations etc.; (9) loss of data; (10) any consumable or equivalent (e.g. cables, power supply, batteries, etc.); or (11) any device on which the serial number is missing or not recognizable.

THE DATALOGIC WARRANTIES ARE EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, WHETHER WRITTEN, EXPRESS, IMPLIED, STATUTORY OR OTHERWISE, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSE. DATALOGIC SHALL NOT BE LIABLE FOR ANY DAMAGES SUSTAINED BY BUYER ARISING FROM DELAYS IN THE REPLACEMENT OR REPAIR OF PRODUCTS UNDER THE ABOVE. THE REMEDY SET FORTH IN THE WARRANTY STATEMENT IS THE BUYER'S SOLE AND EXCLUSIVE

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AV7000 END USER LICENSE AGREEMENT

Scan the QR code to access the Datalogic End User License Agreement.

COMPLIANCE

Electrical Safety

This product conforms to the applicable requirements contained in the European Standard for electrical safety EN-60950 at the date of manufacture.

LED Safety

These camera barcode readers include illumination that use high powered light emitting diodes (LEDs).

Red Light Illuminations

RISK GROUP EXEMPT LED emission according to EN 62471.

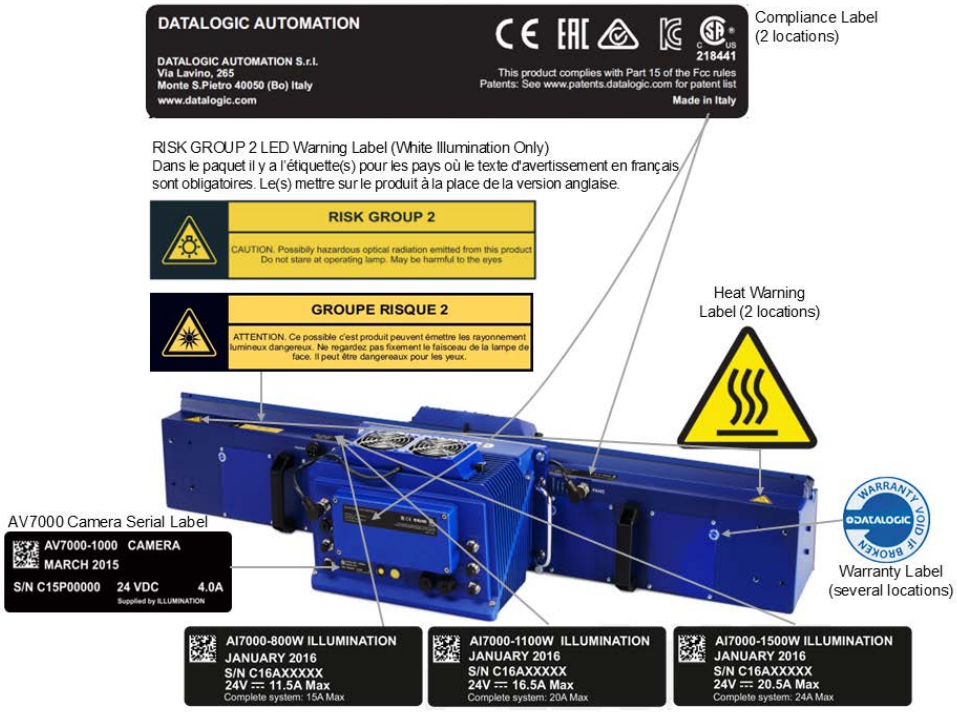
Avoid staring at the LEDs as one would with any very strong light source, such as the sun. A safety device is included that switches the LED illumination to low power mode if the conveyor stops or the trigger cycles cease.

White Light Illuminations

RISK GROUP 2 LED emission according to EN 62471.

Disconnect the power supply when opening the device during maintenance or installation to avoid exposure to hazardous LED light. The LED can be switched on or off through a software command.

Warning and Serial Labels



AI7000 Illumination Serial Labels

WARNING: Disconnect the power supply when installing the device or during maintenance to avoid unintentional exposure to LED light. Avoid starting at the LEDs as one would with any very strong light source, such as the sun. There are no user-serviceable parts inside the reader. Service should only be performed by Datalogic trained and certified technicians.

Power Supply

This product is intended to be installed by **Qualified Personnel** only.

This product is intended to be supplied by a UL listed or CSA Certified Power unit.

European Declaration of Conformity

Hereby, Datalogic S.r.l. declares that the full text of the European Declaration of Conformity is available at: www.datalogic.com. Select the link from the downloads section of the product page.

UKCA Declaration of Conformity

Hereby, Datalogic S.r.l. declares that the full text of the UKCA Declaration of Conformity is available at: www.datalogic.com. Select the link from the downloads section of the product page.

EAC Compliance

Customs Union:

The CU Conformity certification has been achieved; this allows the Product to bear the Eurasian Mark of conformity.

FCC Compliance

Modifications or changes to this equipment without the expressed written approval of Datalogic could void the authority to use the equipment.

This device complies with PART 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference which may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his/her own expense.

UL Listing

CE Compliance

CE marking states the compliance of the product with essential requirements listed in the applicable European directive. Since the directives and applicable standards are subject to continuous updates, and since Datalogic promptly adopts these updates, therefore the EU declaration of conformity is a living document. The EU declaration of conformity is available for competent authorities and customers through Datalogic commercial reference contacts. Since April 20th, 2016 the main European directives applicable to Datalogic products require inclusion of an adequate analysis and assessment of the risk(s). This evaluation was carried out in relation to the applicable points of the standards listed in the Declaration of Conformity. Datalogic products are mainly designed for integration purposes into more complex systems. For this reason it is under the responsibility of the system integrator to do a new risk assessment regarding the final installation.

WARNING: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Bureau Of Indian Standards (BIS)

Self Declaration – Conforming to IS 13252 (Part 1):2010, R-41009288

CHAPTER 1
INTRODUCTION

PRODUCTION DESCRIPTION

The AV7000 Camera is a high performance linear camera with an integrated image processing system dedicated to automatic code identification on moving parcels. AV7000 Cameras provide 8k and 12k sensors. 8k AV7000 cameras will work with version 5.7 or higher.

12k sensor AV7000 cameras offer wider conveyor coverage and higher DPI for OCR and other applications. These cameras with 12k sensors require the following:

- Medium or long illuminations built after *May 1, 2025*
- Software version 6.0 or higher
- 600W power supplies or greater

This chapter introduces the basic concepts necessary for (8k and 12k) camera installation and setup.

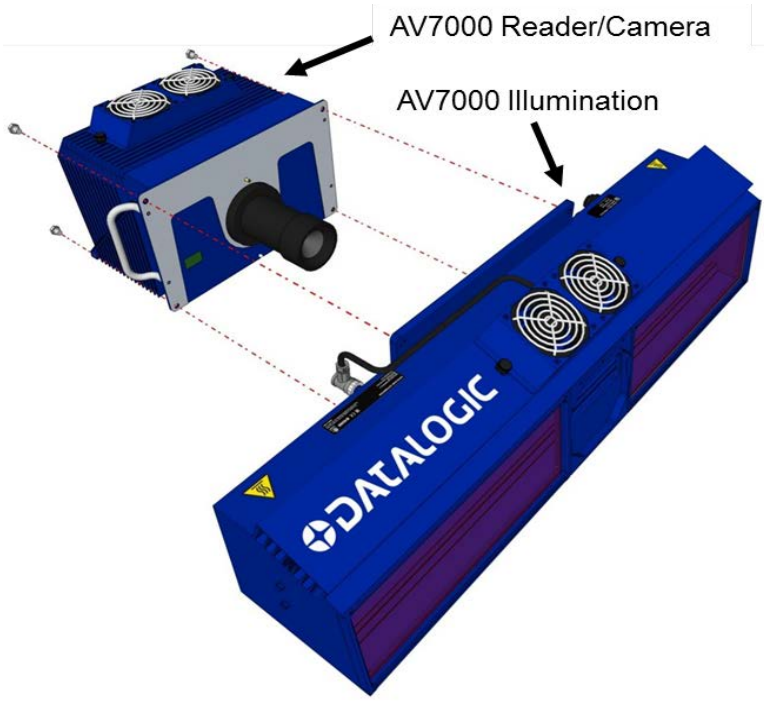
GENERAL VIEW

AV7000 Camera Front View

AV7000 Camera Back View

READING STATION OVERVIEW

The AV7000 camera reading system consists of two pieces:



1. A barcode reader/camera for acquiring images and locating and reading the codes on a target.
2. A lighting system for illuminating the target codes to be acquired.

Most reading system applications use a network of multiple cameras.

All linear cameras need to know the moving speed of the targets to be acquired, so the conveyor speed must be constantly measured. There are several ways to accomplish this.

- **Optical Encoder Wheel (Tachometer):** Used underneath a conventional conveyor. The encoder generates a pulse per specified distance (mm [in]) of conveyor travel.

- **Internal Tach:** This is a software-generated pulse mimicking an encoder/tachometer.
- **PGD100 Speed Detector:** Used with tilt-tray or cross-belt sorters. This detector uses a series of photoelectric sensors to determine the conveyor speed.

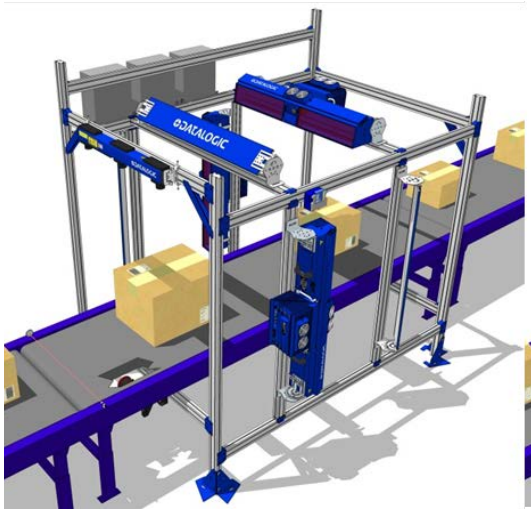
The position sensor (DM3610, RangeFinder, light curtain (DS2), or S85 Position Sensor) can be used as a trigger source. When the height or left/right focus data measured by the sensor goes over a certain threshold, then a package is entering the image valid start, and when it goes under the threshold, the package is providing the image valid stop. In most cases this sensor is not sufficiently precise and an additional "Presence Sensor" (AS1 or photoelectric sensor) input is used. An additional photoelectric sensor or conveyor controller signal is usually connected to a separate trigger input.

When the codes are located on more than one face of the parcel, more than one barcode reader-illuminator pair is necessary (multi-camera reading station). In this case, one of the barcode readers (the "Master") collects the information from all the sensors and distributes it to the other barcode readers using a dedicated Ethernet connection.

A CBX connection box (CBX100, CBX510, CBX800) is used to simplify the connection of the camera to the other system components (photoelectric sensors, encoders, height sensors, and etc.). There is only one CBX box in a multi headed system. This CBX box is connected to the controller camera. Generally the CBX510 will be used. In cases where Fieldbus is required the CBX800 will be needed.

A typical reading station will also include:

- **Power Supply Systems:** The AV7000 requires a 24 Vdc power supply. Usually each barcode reader-illuminator pair has its own power supply system (i. e. PWR-480B).
- **Connection Box:** CBX100, CBX510, or CBX800
- **Height/Side Position Sensor:** RangeFinder, DM3610, light curtain or S85
- **External Deflection Mirrors:** To cover the requested reading field, the cameras must be positioned at a given distance from their targets. In order to create reading stations as small as possible, a deflection mirror is often inserted between the target and the barcode reader.



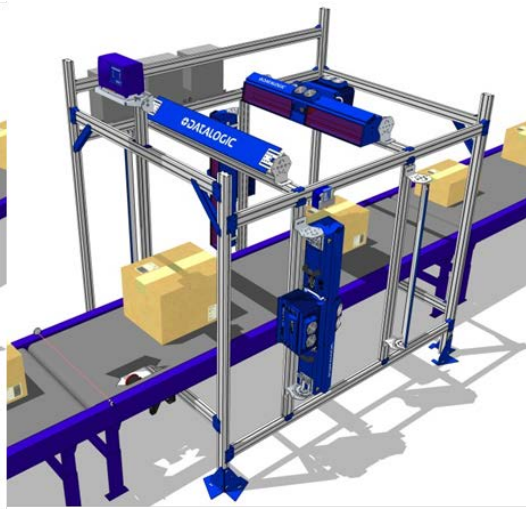


Image Acquisition

Each barcode reader contains two distinct groups of devices:

- The acquisition device or "camera." This part of the AV7000 has to work in strict real time to acquire the best possible images.
- The decoding device or “decoder." This part of the AV7000 interprets the data received through the camera.

The Standard AV7000 barcode reader contains both the camera and the decoder.

As already mentioned, the camera needs three kinds of external sensors:

- **Speed Sensor:** At all times the camera needs to know the speed of the objects to be acquired. The speed sensor is usually an encoder/tachometer connected to the belt, an internal software tachometer, or a PDG100 Speed Detector when using a tilt-tray or cross-belt system.
- **Height/Side Position Sensor: T**he focusing position is computed by the camera based on the position of the parcel measured by a position sensor. The Datalogic sensors may be a RangeFinder, DM3610 Dimensioner, or AREAscan™ DS2 Light Array (LCC-75xx Light Curtain Kit) or S85.
- **Trigger Source:** The camera needs to know when to acquire an object. In multiple camera systems, each package has to be uniquely identified by all the cameras. For this reason, all of the cameras in a reading station share a unique trigger source.

All the sensors are connected to the Master camera that interprets the information and distributes it to the Slave cameras.

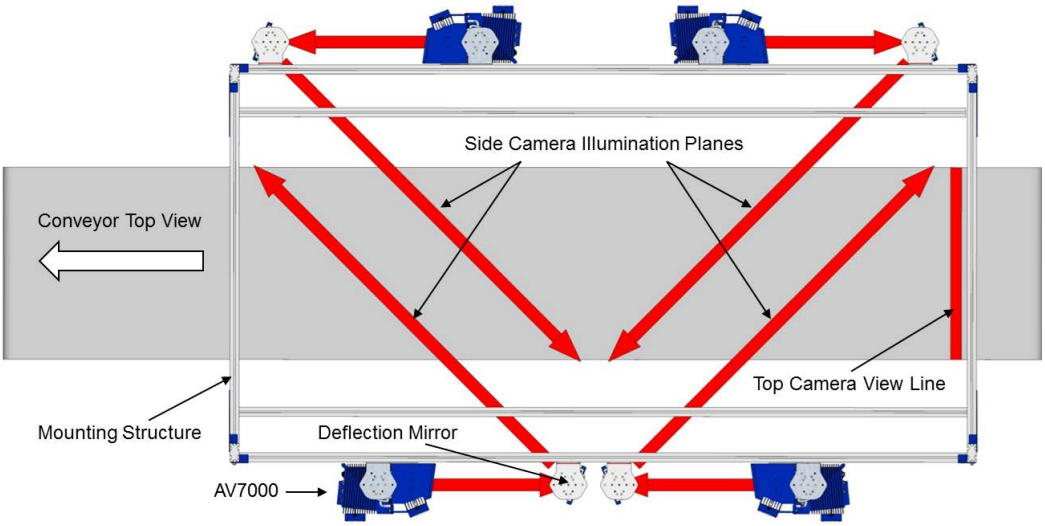
The start and stop of an acquisition are triggered by a start/stop event generated by the trigger device (position sensor). The acquisition of a package doesn’t start when the trigger source detects it, but with a certain delay depending on:

- the distance between the trigger device and the view line and the far distance of the view line for each AV7000 in the Array
- the view line angle (alpha) of the camera
- the speed of the object

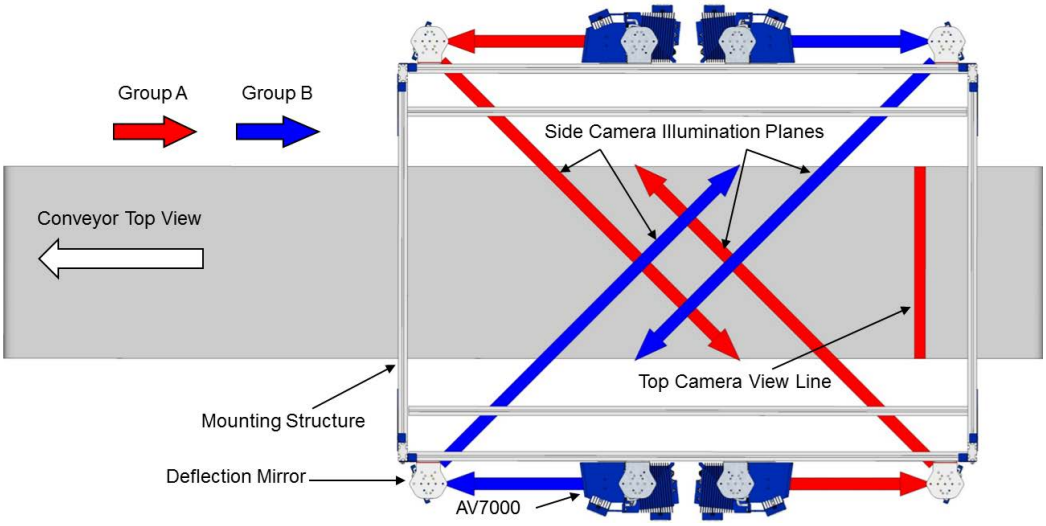
Based on the AV7000 mounting position, the unit tries to acquire one (reading angle alpha = 15°) or two faces of the parcel (alpha = +/-45°). The AV7000 can process a maximum package count of 64 between trigger and transmit.

Pulsed Illumination

When building multi-camera stations with standard continuous light illuminators, the illumination areas must be accurately chosen to avoid the illuminator of one camera disturbing the acquisition of another camera. In particular the lobes of the side camera illuminators must not cross over the conveyor belt. This constraint leads to long multi-sided reading stations.



In **Pulsed Illumination** systems, all the cameras are synchronized so cameras with crossing illuminator lobes are not illuminating simultaneously. Using pulsed illumination, the side cameras' illumination lobes can cross on the conveyor and the reading station dimensions can be greatly reduced.



Enable and configure Pulsed Illumination and adjust image gain when using Pulsed Illumination.

Applications

The AV7000 cameras are specifically designed for industrial applications requiring high reading performance such as:

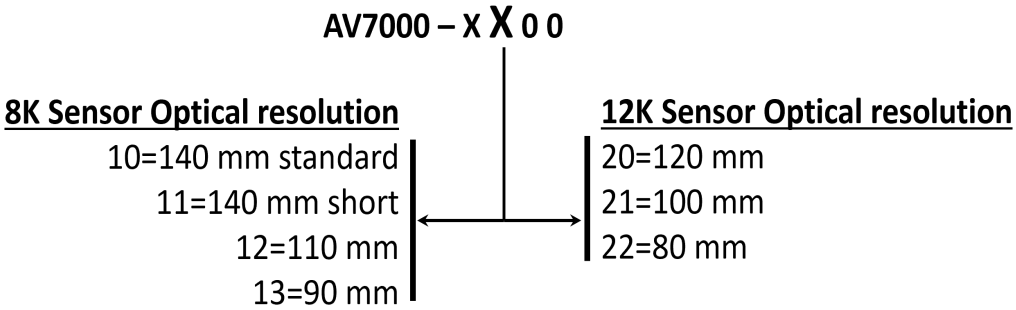
- Low aspect ratio barcodes
- Codes covered by plastic film
- Codes with a large depth of field
- Codes within a wide field of view
- High resolution codes positioned at long distances from the barcode reader
- Fast moving objects

These barcode readers are designed for both single-reader layouts and multi-reader layouts.

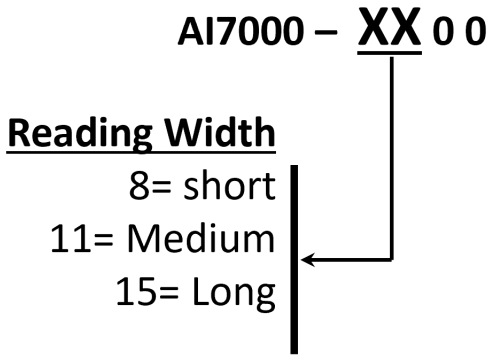
Model Description

AV7000 cameras are available in versions that differ depending on the optical resolution (focus range), while the AI7000 illuminators differ depending on the illuminated reading width:

AV7000 Camera Model Description Key



AI7000 Illumination Model Description Key



AV7000 and AI7000 Versions

Model	Description	Part Number
AV7000 BARCODE READER		
AV7000-1000	140mm f/5.6 STD	934001000
AV7000-1100	140mm f/5.6 SHORT RANGE	934001010
AV7000-1200	110mm f/8.0	934001020
AV7000-1300	90mm f/8	934001030
AV7000-1400	80 mm f/8 Adjustable Aperture	934001040
AV7000-2000	12k 120 mm f/5.6 Adjustable Aperture	934002000
AV7000-2100	12k 100 mm f/5.6 Adjustable Aperture	934002100
AV7000-2200	12k 80 mm f/8 Adjustable Aperture	934002200
AI7000 ILLUMINATION		
AI7000-800	SHORT RED LIGHTING SYS	934001100
AI7000-1100	MEDIUM RED LIGHTING SYS	934001110
AI7000-1500	LONG RED LIGHTING SYS	934001120
AI7000-800W	SHORT WHITE LIGHTING SYS	934001200
AI7000-1100W	MEDIUM WHITE LIGHTING SYS	934001210
AI7000-1500W	LONG WHITE LIGHTING SYS	934001220

External Function Buttons (HMI – Human Machine Interface)

The AV7000 camera includes two external buttons that can be used to perform specific tasks without the need of connecting to **e-Genius** for functional description.

NOTE: Some of these functions may be performed using e-Genius. See e-Genius online help.

Accessories

The following accessories are available on request for the AV7000 Camera Imaging System.

Description	Part Number
AV7000 CAMERA HEADS	
INDIVIDUAL HEADS	
AV7000-1000 140MM F/5.6	934001000
AV7000-1100 140MM F/5.6 SHORT RANGE	934001010
AV7000-1200 110MM F/8.0	934001020
AV7000-1300 90MM F/8	934001030
LIGHTING SYSTEMS	
AI7000-800 SHORT RED LIGHTING SYS	934001100
AI7000-1100 MEDIUM RED LIGHTING SYS	934001110
AI7000-1500 LONG RED LIGHTING SYS	934001120
AI7000-800W SHORT WHITE LIGHTING SYS	934001200
AI7000-1100W MEDIUM WHITE LIGHTING SYS	934001210
AI7000-1500W LONG WHITE LIGHTING SYS	934001220
AV7000 - ACCESSORIES	
EXTERNAL DEFLECTION MIRRORS	
EMK-NVS-800 EXT.MIRROR (800 MM)	93A201111
EMK-NVS-1100 EXT.MIRROR (1130 MM)	93A201110
EMK-NVS-1500 EXT.MIRROR (1460MM)	93A201109
RANGEFINDER FOCUSING	
RANGEFINDER,DLA,0.1IN	93ACC0156
RANGEFINDER,DLA,0.2IN/5MM/10MM	93ACC0157
RANGEFINDER,DLA,0.5IN/20MM	93ACC0159
CAB-GE01 M12-IP67 TO RJ45 1M	93A050034
CAB-GE03 M12-IP67 TO RJ45 3M	93A050035
CAB-GE05 M12-IP67 TO RJ45 5M	93A050036
CAB-GE10 M12-IP67 TO RJ45 10M	93A051389
POWER CORD, 125V, 10A, BLACK - 7 FT. - 6 IN.	0102414001
POWER CORD, 230V, 10A, EUROPEAN - 8 FT.	0102713001
LIGHT CURTAIN FOCUSING	
FOCUS CONTROL 5MT CABLE (M12-FREE WIRES)	93A201203
LCC-7501 AV7 LIGHT CURTAIN 150MM+CAB 10M	93ACC0170
LCC-7506 AV7 LIGHT CURTAIN 600MM+CAB 10M	93ACC0171

Description	Part Number
LCC-7509 AV7 LIGHT CURTAIN 900MM+CAB 10M	93ACC0172
LCC-7512 AV7 LIGHT CURTAIN 1200MM+CAB 10M	93ACC0173
POSITION SENSOR	
(S85) DK-502 DISTANCE KIT RS485 CABLE 5M	93ACC00262
DM3610 DIMENSIONER FOCUSING	
DMS100-100 DIM SOLU 1HD STD NLFT	932702110
FOCUS CONTROL 5MT CABLE (M12-FREE WIRES)	93A201203
PHOTOELECTRIC SENSOR	
S60 PHOTOCELL KIT W/R3 REFL BRKT HDWR	93ACC1895
MEP-593 PHOTOCELL KIT PNP (PH-1) WITH FREE WIRES	93ACC1791
AS1 PHOTOEYE	
AS1-HD-SR-010-J D 3M RES 5MM H 100MM	958101030
CS-A1-03-G-03 M12-5 P 3M (RECEIVER)	95ACC2110
CS-A1-03-G-05 M12-5 P 5M (RECEIVER)	95ACC2120
CS-A1-03-G-10 M12-5 P 10M (RECEIVER)	95ACC2140
CS-A1-02-G-03 M12-4 P 3M (EMITTER)	95A251280
CS-A1-02-G-05 M12-4 P 5M (EMITTER)	95A251270
CS-A1-02-G-10 M12-4 P 10M (EMITTER)	95A251390
WIRE CONN,COMPACT,3COND,12-28AWG	890003099
TACHOMETER/ENCODER	
TACH,PROGR,W/20FT CAB,8-30VDC	1000019875
KIT,TACH BRKT GENERAL/EXTRUSION MTG	1000020567
ASSEMBLY,ANTI-STATIC BRUSH W/FERRITE	0102974001
OEK-2 OPTICAL ENCODER (CAB 10M+SPRING)	93ACC1770
OEK-3 ENCODER HI RES M139,6M CBL +SPRI (START/STOP ANTI ROLLBACK)	93ACC0104
CV-A1-22-B-03 SE 4PIN CABLE 3M	95ACC1480
CV-A1-22-B-05 SE 4PIN CABLE 5M	95ACC1490
CV-A1-22-B-10 SE 4PIN CABLE 10M	95ACC1500
CV-A1-22-B-15 SE 4PIN CABLE 15M	95ACC2070
CV-A1-22-B-25 SE 4PIN CABLE 25M	95ACC2090
POWER SUPPLY	
PG-600 PWR SUPPLY 600W	93A201205
PWR-480B POWER UNIT 110/230VAC 24V	93ACC0076
PWR-360X2 POWER UNIT 110/230VAC 24V, CE	93ACC0470

Description	Part Number
CBL,JKTED,300V,18AWG,BLK,RED,GRN,N=1FT	890003359
PWR CORD 18 AWG 3 COND 118" BLACK SJT	890002738
ETHERNET SWITCHES	
SINGLE GIG 8-PORT SWITCH ENCLOSURE	93ACC0160
DUAL GIG 8-PORT SWITCH ENCLOSURE	93ACC0131
SYNC CABLES	
CAB-GE03 M12M TO M12F 3M	93A050079
SYNC SETUP DONGLE 8P(M), M12(F), RJ45, 0.2 M	1000065716
CAB-GE05 M12M TO M12F 5M	93A050080
CAB-GE10 M12M TO M12F 10M	93A050081
CAB-GE03 M12M-8PINS TO M12M-4PINS 3M	93A050109
CAB-GE05 M12M-8PINS TO M12M-4PINS 5M	93A050110
HOST AND IMAGE NETWORK CABLES	
CAB-9E05 RJ45-IP67 CABLE ETHERNET 5M	93A051364
CAB-9E10 RJ45-IP67 CABLE ETHERNET 10M	93A051365
AV7000 TO CBX CABLES	
CBL AV7-100 M16-IP67 CABLE TO CBX 3M	93A050072
CBL-AV7-101 M16-IP67 CABLE TO CBX 5M	93A050073
CBL-AV7-102 M16-IP67 CABLE TO CBX 10M	93A050074
CBX	
CBX100 CONNECTION BOX COMPACT	93A301067
CBX510 CONNECTION BOX MODULAR	93A301068
CBX510 CONNECTION BOX MODULAR	93A301087
CBX800 GATEWAY	93A301077
CBX ACCESSORIES For AV7000 applications, the CBX Fieldbus modules listed are only used in the CBX800 Gateway	
BM300 PROFIBUS MODULE	93ACC1810
BM310 PROFIBUS IP65 MODULE	93ACC1811
BM400 DEVICENET IP65 MODULE	93ACC1814
BM500 ETHERNET/IP MODULE	93ACC1812
BM510 ETHERNET IP65 MODULE	93ACC1813
BM520 ETHERNET/IP IP54 MODULE	93ACC1840
BM600 CAN OPEN MODULE	93ACC1815
BM700 PROFINET MODULE	93ACC1816
BM1100 CC-LINK MODULE	93ACC1845

Description	Part Number
BM1200 MODBUS TCP MODULE	93ACC1848
BM1210 MODBUS TCP IP65 MODULE	93ACC1849
BA100 DIN RAIL ADAPTERS	93ACC1821
BA900 TWO CABLE GLANDS PANEL	93ACC1847
BA300 M12 3P F. PANEL CONN. (SERVICE)	93ACC1877
BA400 M12 3P M. PANEL CONN. (EXT.POWER)	93ACC1853
BA500 M12 4P F. PANEL CONN. (TRIGGER)	93ACC1854
BA600 M12 5P F. PANEL CONN. (ID-NET OUT)	93ACC1855
BA700 M12 5P M. PANEL CONN. (ID-NET IN)	93ACC1856
DISPLAY	
KIT, VGA / USB INTERFACE PANEL	93A201204
KIT, MONITOR/KEYBRD/BRKT/USB HUB	93ACC0126
CBL,EXT,10FT,USB MOUSE/KEYBOARD	93ACC0108
CABLE,INTERFACE 10FT (MONITOR EXTENSION)	1000014572
CABLE,INTERFACE 25FT (MONITOR EXTENSION)	1000014574
MISCELLANEOUS	
AV7000 Controller Key	93A201206
FAN GUARD	93ACC0193
AV7000 Double Fan Kit	890000030

For AV7000 applications, the CBX Fieldbus modules listed above are only used with the CBX800 Gateway.

Focusing Devices

There are six focusing device options available for the AV7000 Camera, see section Five for details.

Photoelectric Sensor

The Datalogic Photoelectric Sensor is used in AV7000 camera systems to detect the presence of an item entering the scanning area.

The photoelectric sensor is used in singulated systems where the packages are separated by an open space between the trailing edge of one package and the leading edge of the next. In irregular package applications, the photoelectric sensor assists in maintaining the package footprint so that the AV7000 camera will only scan and provide data for a specific package.

Depending on the application, these devices may need to be configured differently. While the photoelectric sensor and tachometer work well with belt conveyors, a special configuration is needed for tilt-tray and cross-belt sorter applications.

Photoelectric Sensor

S60 PHOTOCELL KIT W/R3 REFL BRKT HDWR	93ACC1895
MEP-593 PHOTOCELL KIT PNP (PH-1) WITH FREE WIRES	93ACC1791

Area Sensor

The photoelectric light grids of the AS1 series are crossed-beam area sensors able to detect all objects, with even 0.2mm thickness, inside a 100mm height, over operating distances reaching 3m between emitter and receiver. The AS1 area sensors represent the ideal solution for the detection of very small objects, even when passing in different positions inside the controlled height and width. Versions with trimmer adjustment and optic synchronism between emitter and receiver unit are available. Area sensors also help avoid multiple triggers on irregular shaped packages.

Area Sensor and Cable (recommended)

AS1-HD-SR-010-J D 3m RES 5mm H 100mm	958101030
CS-A1-03-G-03 M12-5 p 3m (Receiver)	95ACC2110
CS-A1-03-G-05 M12-5 p 5m (Receiver)	95ACC2120
CS-A1-03-G-10 M12-5 p 10m (Receiver)	95ACC2140
CS-A1-02-G-03 M12-4 p 3m (Emitter)	95A251280
CS-A1-02-G-05 M12-4 p 5m (Emitter)	95A251270
CS-A1-02-G-10 M12-4 p 10m (Emitter)	95A251390

LCC-75xx Kit with DS2 Light Array

The DS2 Light Array (Light Curtain), part of the LCC-75xx kit, is used to detect the presence of products as they enter the scanning area as well as report the package heights to the system Master. The AREAscan™ family of the DS2 series covers controlled heights ranging from 150 to 2500mm, with 5m operating distances for high resolution versions, or 10m for low resolution versions. Digital resolution is 12mm or 35mm while relative measurement precision is ±6mm or ±22.5mm.

Light Curtain Focusing

FOCUS CONTROL 5MT CABLE (M12-FREE WIRES)	93A201203
LCC-7501 AV7 LIGHT CURTAIN 150MM+CAB 10M	93ACC0170
LCC-7506 AV7 LIGHT CURTAIN 600MM+CAB 10M	93ACC0171
LCC-7509 AV7 LIGHT CURTAIN 900MM+CAB 10M	93ACC0172
LCC-7512 AV7 LIGHT CURTAIN 1200MM+CAB 10M	93ACC0173

Position Sensor

The DK-502 Distance Kit is part of a vision system used to signal the focus range of packages to be imaged by the AV7000 camera. It includes an S85 Class 2 visible red LASER sensor to measure direct proximity from .2 m to 5 m. It includes PNP or NPN, 4-20 mA analog output and RS 485 serial interface.

It comes with:

- Mounting bracket and non-reflective plate
- CVL 2811 Connection cable
- Installation Guide

Distance Sensor	
DK503 Distance Sensor Kit	93ACC0263

RangeFinder

The RangeFinder is used to detect the presence of products as they enter the scanning area as well as report the package positions/heights and sequence number to all cameras in the system. RangeFinders can also be used to provide rough dimensioning data.

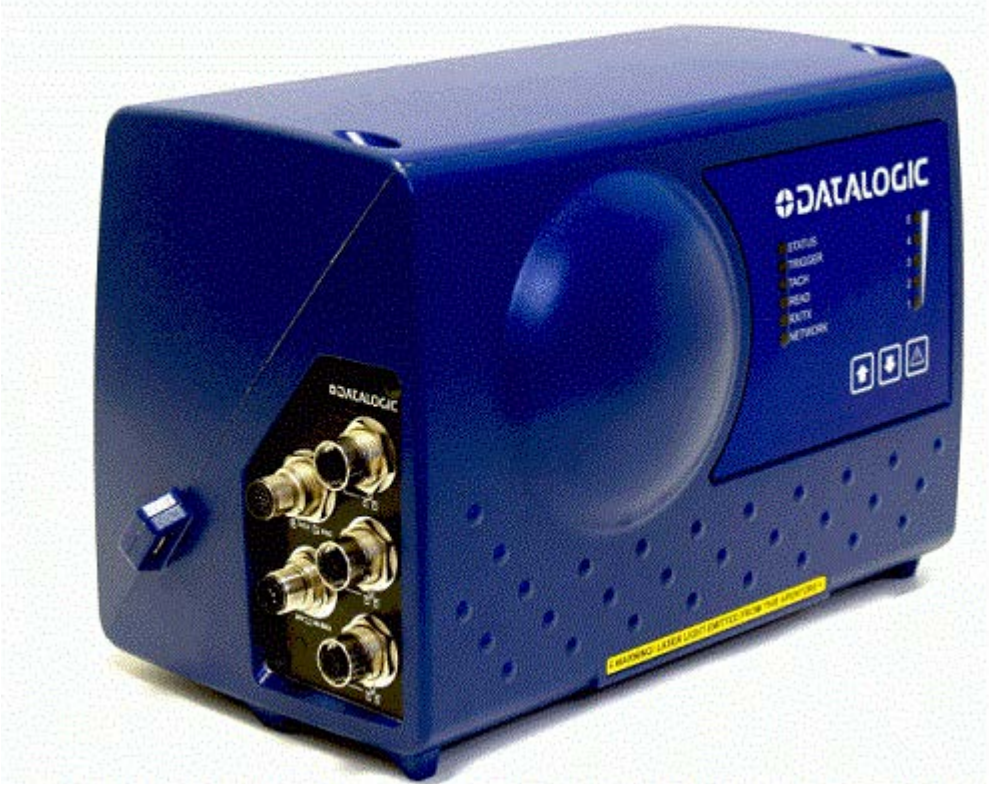
The RangeFinder module includes the following:

- RangeFinder Module
- RangeFinder Power Supply
- Mounting and adjustment brackets
- Power Supply

RangeFinder	
RANGEFINDER,DLA,0.1IN	93ACC0156
RANGEFINDER,DLA,0.2IN/5mm/10mm	93ACC0157
RANGEFINDER,DLA,0.5IN/20mm	93ACC0159

DM3610 Dimensioner

The DM3610 is used to detect the presence of products as they enter the scanning area as well as report the package positions/heights and sequence number to all cameras in the system. The DM3610 can also provide certified (Legal for Trade), side-by-side package detection, or volume measurements for the packages that pass below it. For complete information about the features and capabilities of the DM3610 Dimensioner, see the dimensioner page on the Datalogic website: www.datalogic.com.



The DM3610 Dimensioner requires the following:

- DM3610
- Power Supply
- Universal Mounting Bracket
- Class 2 EU Adapter (optional)
- Beam Catchers

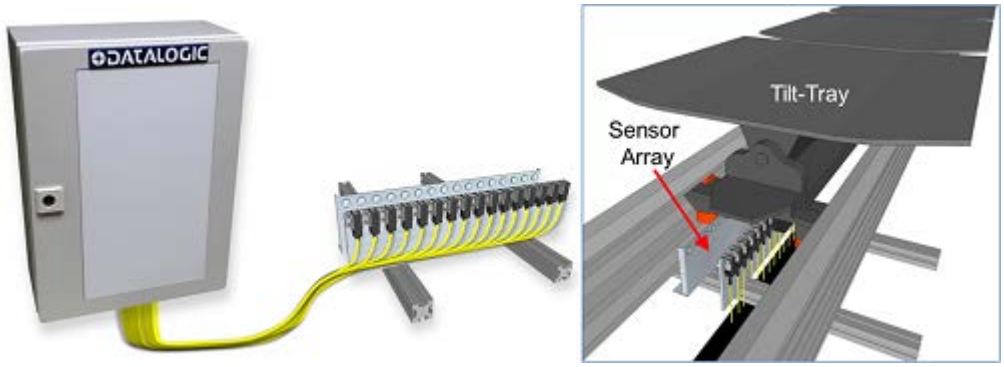
Encoder (Tachometer)

The encoder/tachometer delivers a continuous pulse to the system, which provides feedback on conveyor speed and transmit point, and can be used to help track the package position along the length of the conveyor.

Encoder (Tachometer)	
OEK-2 OPTICAL ENCODER (CAB 10m+SPRING)	93ACC1770
OEK-3 OPTICAL ENCODER HI RES,6M CBL+SPRI	93ACC0056
OEK-3 ENCODER HI RES M139,6M CBL +SPRI (START/STOP ANTI ROLL-BACK)	93ACC0104

PGD100 NON-CONTACT SPEED DETECTOR

The **PGD100** is a non-contact position measurement device, or **Speed Detector**, consisting of a Controller and Sensor Array(s). It is used in cases where a traditional contact encoder/tachometer will not work, as in a **Cross-Belt Sorters** or **Tilt-Tray** system where a continuous belt surface is not available. The speed detector is designed to function as an encoder/tachometer replacement in certified dimensioning and scanning applications.



For information on installing and wiring the PGD100, see the **PGD100 Non-Contact Speed Detector Installation Manual** at www.datalogic.com.

CBX INDUSTRIAL CONNECTION BOX

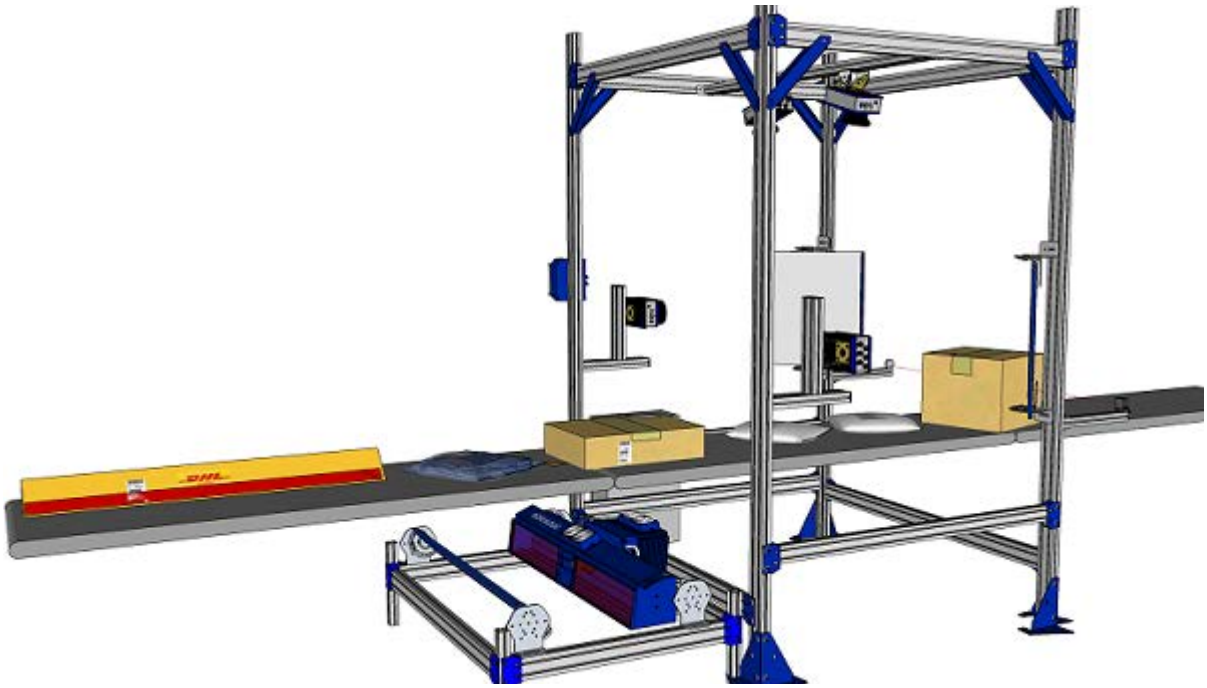
CBX Series are industrial connection boxes that can be used to connect the barcode readers to an encoder/tachometer, photoelectric sensor, serial devices, relays, or other peripherals.

CBX Connection Box

CBX100 CONNECTION BOX COMPACT	93A301067
CBX800 GATEWAY	93A201077
CBX510 CONNECTION BOX MODULAR	93A301087
BM100 Backup Module (Memory)	93ACC1808
BA100 DIN Rail Mounting Kit	93ACC1821
BA200 Bosch Frame Mounting Kit	93ACC1822
BA300 M12 3PF Service Connector (Aux port)	93ACC1877
BA500 M12 4PF Trigger Connector	93ACC1854
BA900 Two Cable Compression Conn. Panel	93ACC1847
CAB-DS01-S I/O Cable M12-17-pin to 25-pin D-sub 1m	93A050058
CAB-DS03-S I/O Cable M12-17-pin to 25-pin D-sub 3m	93A050059
CAB-DS05-S I/O Cable M12-17-pin to 25-pin D-sub 5m	93A050060
CAB-SC5000 Cable SC5000 to CBX510 1m	93A050071
CBX800 GATEWAY	93A301077

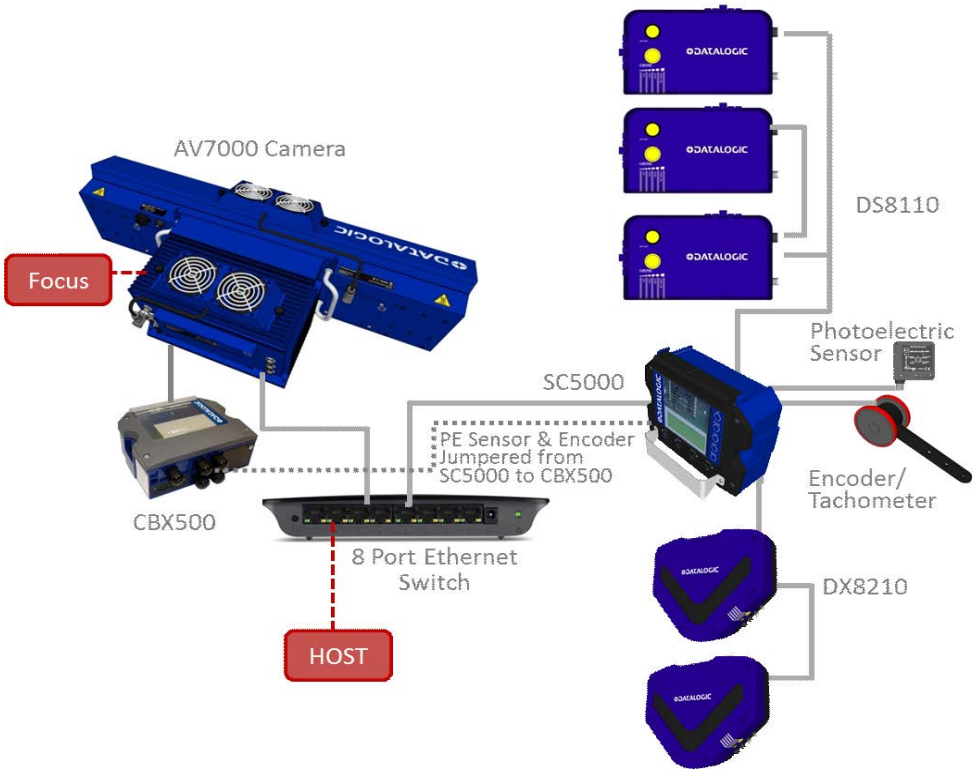
AV7000 AND AV500 SYNCNET APPLICATION

The AV7000 and AV500/AV900 Cameras can easily be used in combination using Sync-Net communications.



INTEROPERABILITY OPTIONS AVAILABLE

Some applications may require you to combine an AV7000 system with an SC5000 Controller and accompanying scanners (DS8110 and DX8210). Datalogic offers special interoperability features for this type of configuration. Reference the **SC5000/DS8110, DX8210 and AV7000 Hybrid System Application Note** for more details.



CHAPTER 2
MECHANICAL INSTALLATION

ESD CAUTION: AV7000 cameras contain electronics that may be affected by electrostatic discharge (ESD). To prevent personal injury or damage to the unit, please follow the safety precautions and warnings found in the References section at the beginning of this manual. Failure to follow these precautions may void your warranty.

PREPARING FOR MECHANICAL INSTALLATION

NOTE: Application-specific drawings and documents provided by Datalogic supersede any contradictory content in this manual.

Before mounting any components, please do the following:

- Read all instructions before beginning your installation.
- Define and confirm the accuracy of your application's requirements and structure position, especially the height of the conveyor from the floor.
- Review all installation-specific drawings provided with your equipment.
- Review and plan the mechanical installation of all devices used in your application. Be sure to allow adequate clearance for maintenance.
- Review and plan the power requirements for your application.
- Check the contents of the shipping cartons against the packing list.
- Record all product serial numbers.

NOTE: Refer to the Chapter 3 Electrical Installation and Reference Documentation for details on connecting your readers to other devices in the system.

When installing several AV7000s, take care to position them so that no laser beam or LED illumination enters the reading window of other barcode reading devices in the system. This condition could occur more frequently for side mounted applications. If these precautions are not followed, read rate could be negatively affected. To resolve this problem, it is sufficient to slightly change the inclination and/or position of one of the two devices involved.

Tools Required

A 13mm wrench (combination ratcheting wrench recommended) and Philips Screwdriver (#1) are all the tools needed to assemble and install the AV7000/AI7000, deflection mirror, and brackets,

Unpacking Instructions

Verify that the AV7000 Camera and all the parts supplied with the equipment are present and intact when opening the packaging; the list of parts includes:

AV7000 Camera

GMC-2034 GR Fan

Hardware Pack:

(2) Knob Knurled, M4 x 6
(4) Mounting Bolts, M8 x 12 UNI 5739 ZB

Test Charts:

CH-3 Autofocus Setting Chart 800x100mm
Dynamic Focus Chart
Picket Fence/Step Ladder Resolution

Installation Guide

AV7000 Downgrade Procedure

NOTE: The AV7000 Camera and accessory packaging is designed to protect the unit(s) during shipment. Do not throw it away. Save all packing material in case you need to transport your unit(s).

Be sure to retain shipping boxes and packing material for use if the unit needs to be returned to Datalogic for any reason.

The AI7000 comes packaged separately and includes the following:

AI7000 Illuminator

CVL-2389 Cable PS to AI7000, 6M

CAB-503 9P 01M12-IP6 Cable 0.6M

Hardware Pack

(4) M8X1.25,12MM,SEM BOLT,HEX,SS
(4) SCREW M 8 X 8 UNI 5739 ZB
(14) SCREW M 8 X 12 UNI 5739 ZB
(2) SCREW M 4 X 8 UNI 7687 WZ
(4) STUD,T-SLOT,5/16-18X3/4 DROP-IN
(4) LOCKNUT,HEX,5/16-18,SERRATED-FLANGE,STL
(4) SCREW M 8 X 25 HAMMER HEAD+INOX NUT
(2) SPACER H=5 D8 CYL.NICKEL BRASS

Brackets:

(2) - ST-0872 Rising Bracket
(2) - ST-326 Support Bracket
(2) - ST-0871 Main Bracket

NOTE: Be sure to retain shipping boxes and packing material for use if the unit needs to be returned to Datalogic for any reason.

INSTALLATION SEQUENCE

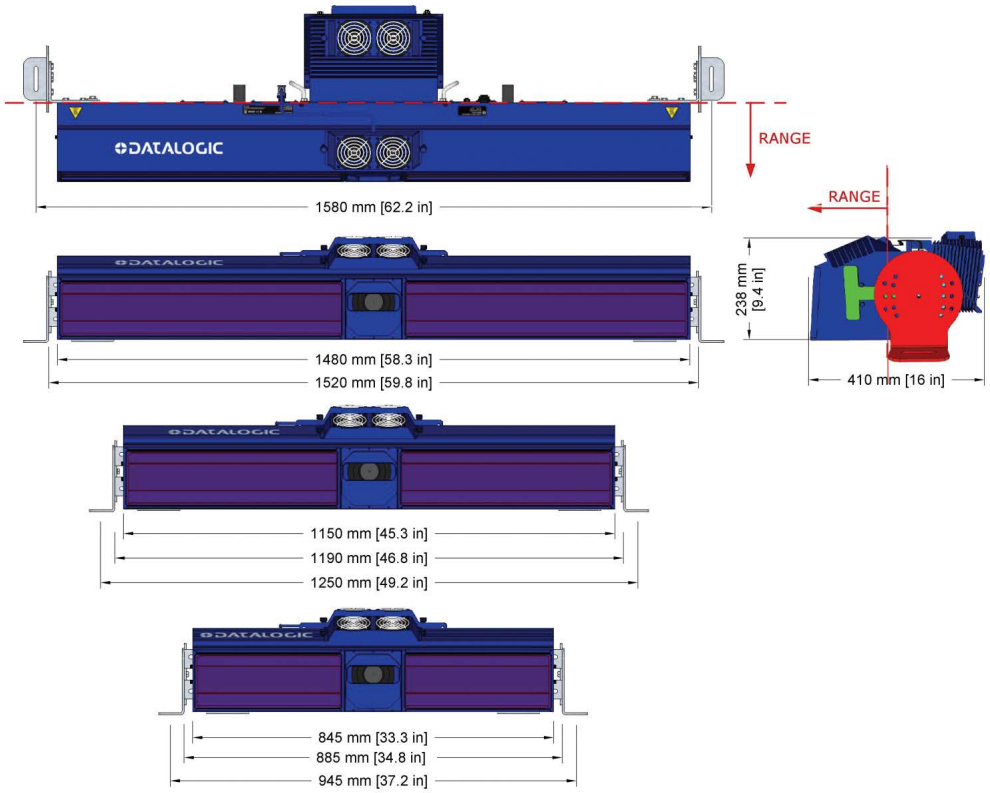
NOTE: Everything should be MECHANICALLY INSTALLED before performing any ELECTRICAL INSTALLATION. See Chapter 3, Electrical Installation for electrical installation details.

To complete mechanical installation and setup, you must:

1. Review the details of your application's requirements
2. Erect mounting structure or other supporting structures
3. Determine and mark the Mounting Bracket locations
4. Mount the fan assembly to the AV7000 Camera
5. Pre-Assemble the illuminator brackets
6. Mount the AI7000 Illuminator to its mounting brackets
7. Mount the brackets to the mounting structure.
8. Mount the AV7000 Camera to the Illuminator
9. Mount the brackets for the deflection mirror, if required.
10. Mount the deflection mirror to its brackets
11. Mount the height sensor (AS1, Light Curtain, RangeFinder, DM3610 Dimensioner, or S85)
12. Mount the photoelectric sensor to the mounting structure (optional)
13. Mount the tachometer to the mounting structure
14. Mount the CBX connection box to the mounting structure
15. Complete electrical installation.
16. Align the AV7000 for proper operation
17. Align the height sensor for proper operation
18. Configure the AV7000.
19. Calibrate the AV7000.
20. Check AV7000 operations.

Installation

Dimensions and Clearances



WARNING: The AV7000 is a sealed, unventilated unit. Mounting the unit with 300 mm [12 in] of clearance (front, top, and sides) is recommended for cooling and ease of maintenance.

Physical Support Requirements

For details on the weight of the barcode readers, see Chapter 10, Technical Features. Multiple-head systems may include further details on the physical support requirements with any application-specific documentation provided.

Vibration Limitations

See Chapter 10 **“Technical Features” on page 192**.

General Mounting Guidelines

It is important that you follow these general precautions when installing, setting up, operating, maintaining, troubleshooting, or replacing any Datalogic products, parts or related equipment.

As you plan and install your AV7000 camera imaging system application, be sure to keep the following guidelines in mind:

- Follow application drawings for structural details and barcode reader placement.
- Determine the proper orientation and position of the barcode reader(s).
- Leave adequate clearances (approximately 300 mm [12 in]) for wiring.
- The first camera in the system must be installed at least 254 mm [10 in] upstream from the focus device (DM3610, RangeFinder, light curtain, or S85) to work properly.
- Route wires carefully to reduce or minimize electrical noise. When power and communication wiring must cross, make their intersection perpendicular. Avoiding sharp wire bends or loops, which can affect performance.
- Proper grounding limits the effects of noise due to Electromagnetic Interference (EMI).

Mounting Structure Considerations

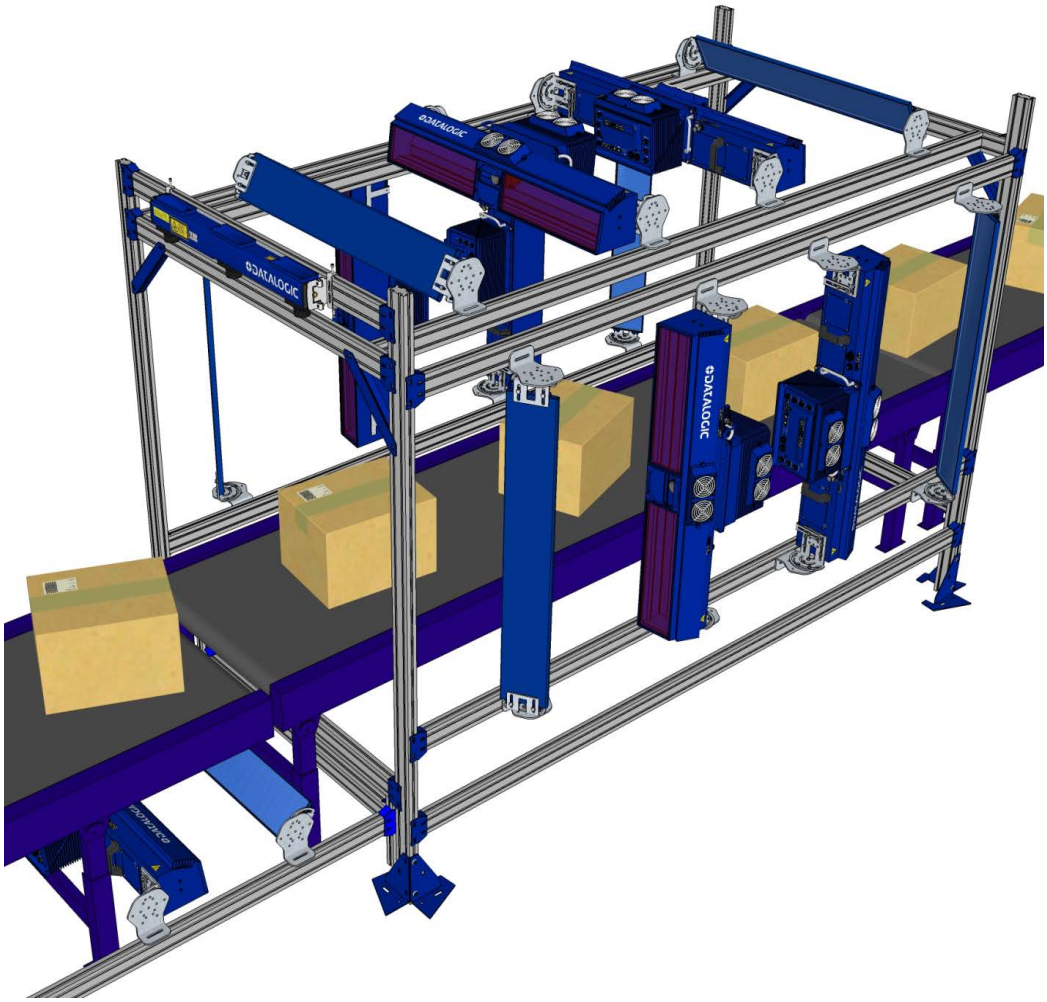
Your first task is to mount your AV7000 camera. You can provide your own mounting structure or Datalogic can design one for you. We recommend using a Datalogic mounting structure for standard applications.

Your mounting structure must provide the following capabilities:

- It is adjustable enough for you to move your unit to the optimum position for proper scanning.
- It allows a technician access to the barcode reader while it is mounted.
- It must be as vibration free as possible so as not to affect the scanning accuracy.
- It is constructed of steel or aluminum.
- It provides approximately 300 mm [12 in] minimum clearance on all sides. This clearance is necessary to provide proper ventilation, allow access to all panels of the barcode reader, and allow room for proper servicing.

Scanning Station Frame/Mounting Structure Preparation and Positioning

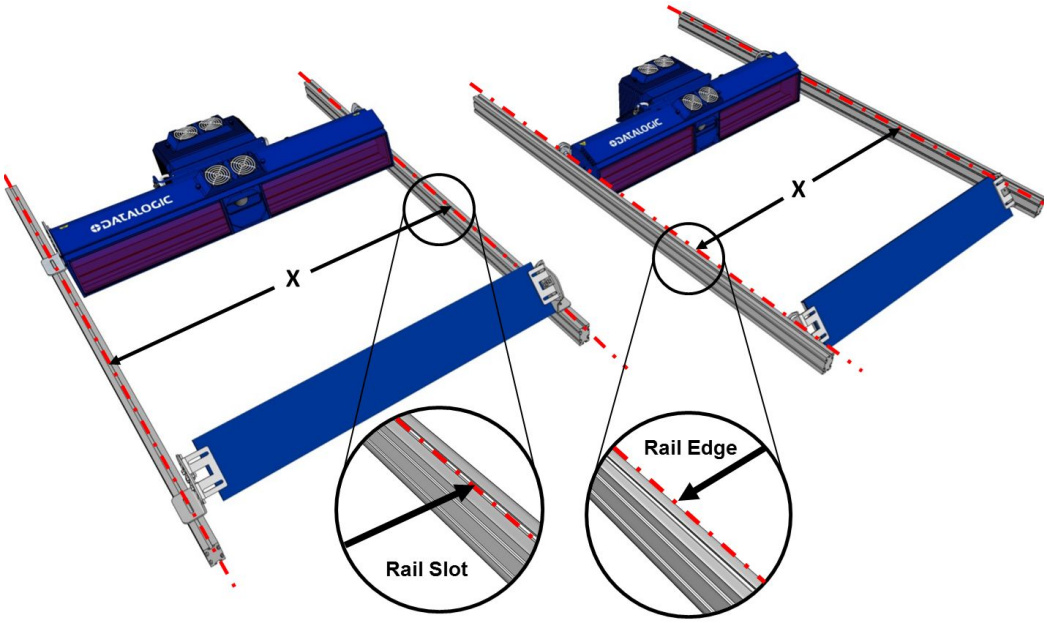
The vision system components and in particular the mounting brackets have been designed for installation onto standard Bosch and 80/20 frame profiles (extrusions) and accessories. 60x60 mm profile is recommended for Bosch, although 45x45 mm profiles will work; and standard 1.5” x 3” for 80/20.



NOTE: This illustration does not show the current brackets.

Mounting Rails

The Camera/Illuminator and Deflection Mirror are mounted to mounting structure rails, as shown below. Typically, the rising brackets are mounted to the rails, but in some cases it may be necessary to mount the camera and deflection mirror between the mounting rails.



For Rail configurations, the rails must be mounted so that the distance between the extrusion profiles (Bosch or 80/20) matches the illuminator model being used.

For Top Camera positions (both Direct and Indirect), the distance between the profiles measured from the internal sides is given in the following table depending on the illuminator model:

Illuminator	Body Width	x Distance Between Rail Slots with Rising Brackets		x Distance Between Rails without Rising Brackets	
Short	845 mm	945 mm	37.2 in	885 mm	34.8 in
Medium	1150 mm	1250 mm	49.2 in	1190 mm	46.8 in
Long	1480 mm	1580 mm	62.2 in	1520 mm	59.8 in

For Side Camera positions (either Direct or Indirect), the distance between the profiles measured from the internal sides is given in the following table depending on the illuminator model:

Illuminator	Body Width	x Distance Between Rail Slots with Rising Brackets		x Distance Between Rails without Rising Brackets	
Short	845 mm	955 mm	37.6 in	895 mm	35.24 in
Medium	1150 mm	1260 mm	49.6 in	1200 mm	47.24 in
Long	1480 mm	1590 mm	62.6 in	1530 mm	60.24 in

Illuminator Bracket Pre-Assembly and Mounting

The mounting brackets have been designed specifically to quicken, simplify and facilitate vision system mounting.

These brackets have universal mounting configurations and reference slots for all standard mounting angles allowing all of the standard Camera mounting positions to be made without the use of special tools.

The Illuminator Bracket kit included with the Camera contains:

(2) ST-0871 universal main brackets

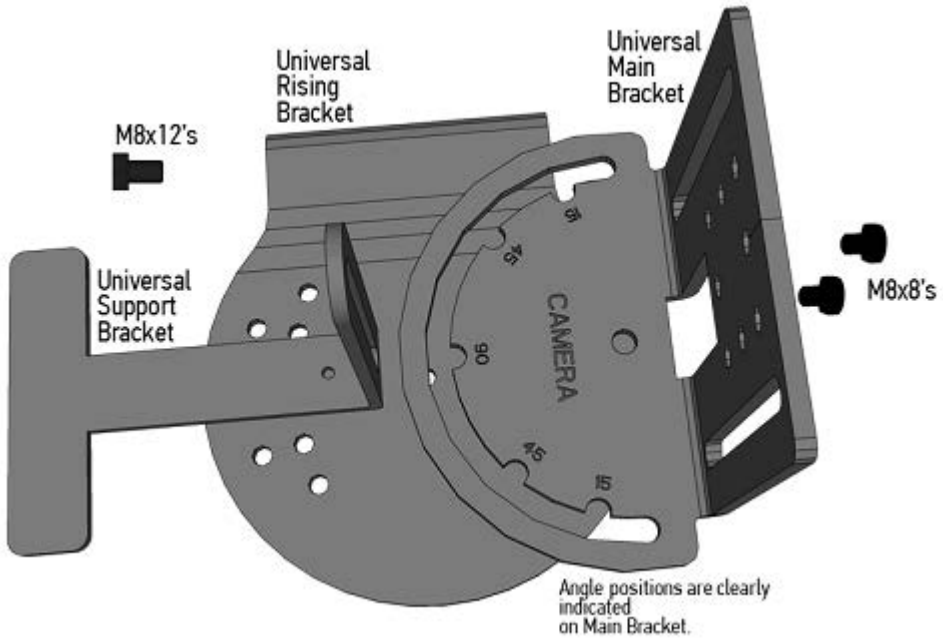
(2) ST-0326 universal support brackets

(2) ST-0872 universal rising brackets

(4) M8x8 bolts (for support to main bracket assembly)

(8) M8x12 bolts (for illuminator to main bracket assembly)

NOTE: Be sure to use the M8x8 (short) bolts when mounting the support brackets to the main bracket. Longer bolts will pass through the other side of the main bracket, interfering with the illuminator body.



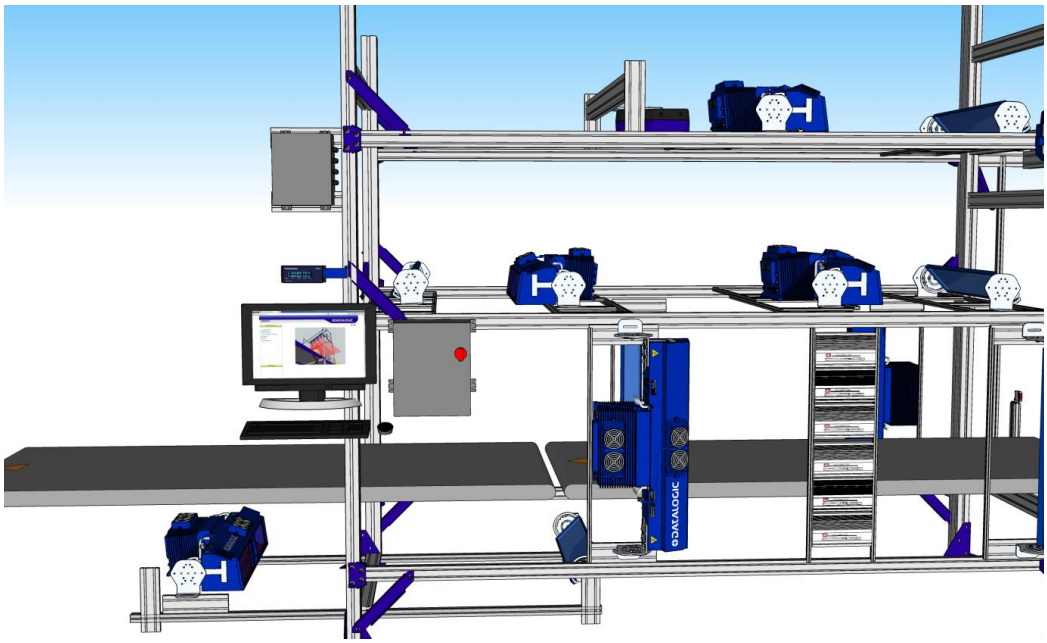
AV7000 Mounting Sequence

Since the brackets are mounted directly to the body of the illuminator and the camera is mounted directly to the body of the illuminator, no matter what standard mounting position is used, (Top, Side, or Bottom), the basic sequence is the same:

1. Mount the cooling fan to the AV7000 camera *(*See section “Mounting the AV7000 Camera to the AI7000 Illuminator” on page 37*).*
2. Pre-assemble the Illuminator brackets according to the application.
3. Mount the brackets to the mounting frame.
4. Mount the Illuminator to the bracket.
5. Mount the Camera to the illuminator.

AV7000 Bottom Mounting

In some applications it is beneficial to mount an AV7000 under the conveyor. When mounting a bottom read AV7000, it must be done so under a break in the conveyor.



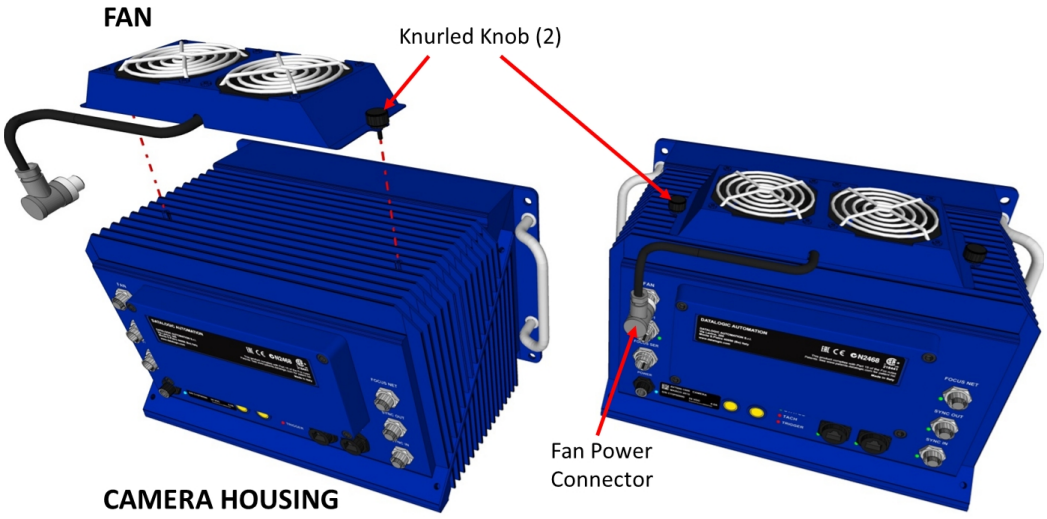
NOTE: This illustration does not show the current brackets.

Mounting the Fan to Camera Housing

The AV7000 Camera is shipped without the cooling fan attached to the top of the housing. Before mounting the camera to the illuminator, first mount the fan to the camera housing, as shown below.

To mount the cooling fan to the camera housing:

1. Position the fan over the housing and insert the knurled knobs (bolts).
2. The knurled knobs should be finger tight. Do not over-tighten.
3. Push the fan's power connector into the **FAN** connector on the back of the camera housing, and screw it in place.



NOTE: The cooling fan should be plugged into the camera's FAN port before the camera has been powered up. If the cooling fan is plugged into the camera after the camera has been powered up, the camera may not recognize and power the fan until the camera is rebooted.

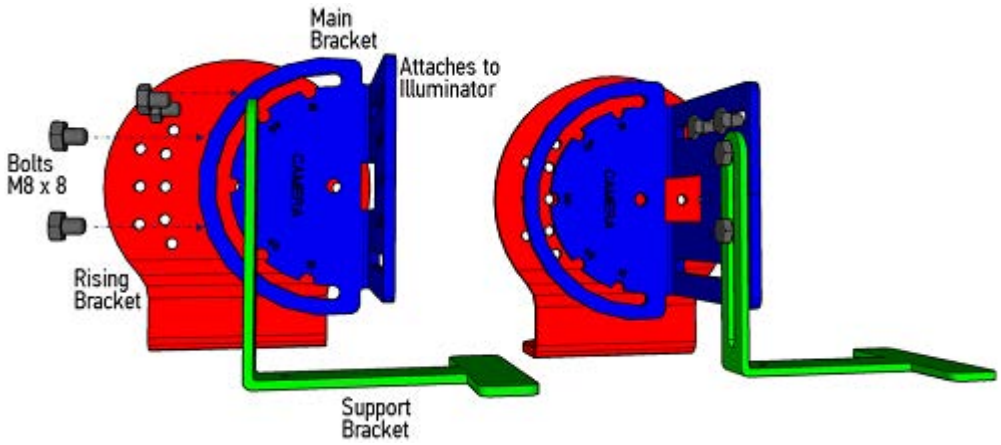
Illuminator Bracket Pre-Assembly

Mounting brackets are designed for quick and simple mounting. These brackets can be mounted in all configurations. Reference slots for all standard mounting angles can be made without the use of special tools.

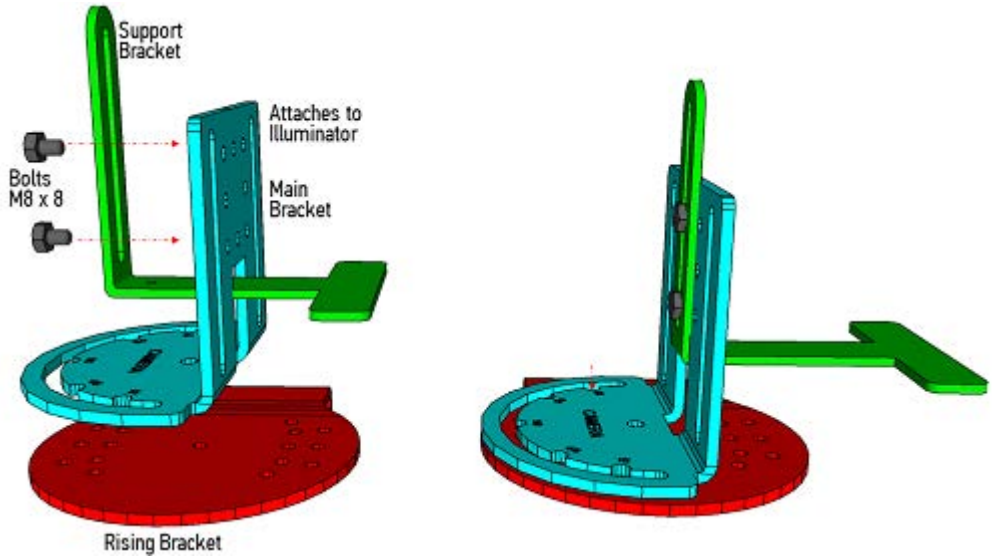
The Illuminator Bracket kit included with the Camera contains all you need.

WARNING: Keep the original packaging for use when sending products to the technical assistance center. Damage caused by improper packing is not covered under the warranty.

Top mount camera positions require the following pre-assembly of the illuminator bracket.

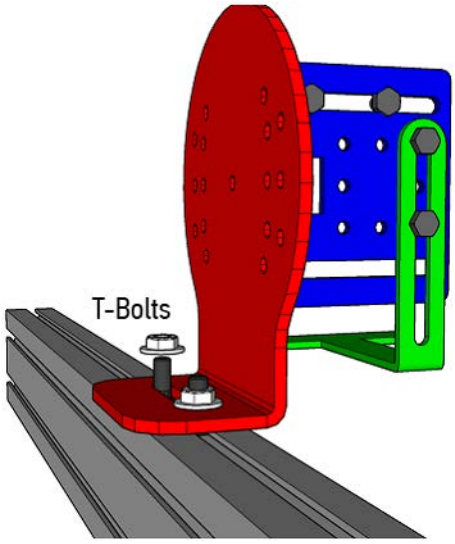


Side mount camera positions require the following pre-assembly of the illuminator bracket.



Mount Brackets to Mounting Frame

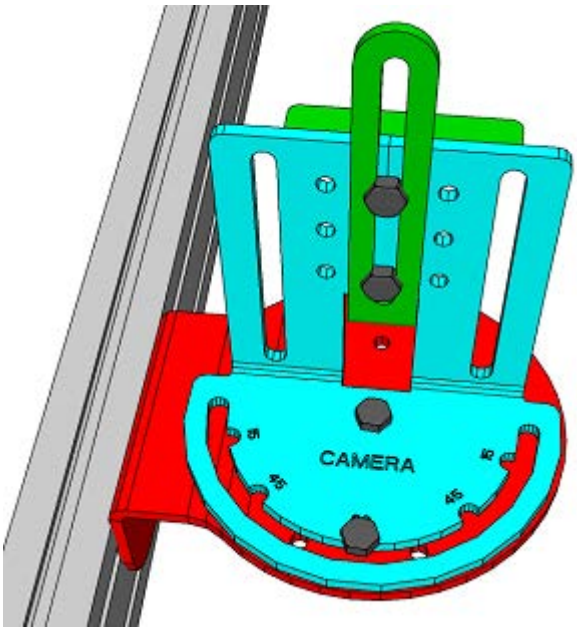
Using T-Bolts mount Rising Bracket to rails. Reference customer specific mounting diagrams for proper positioning.



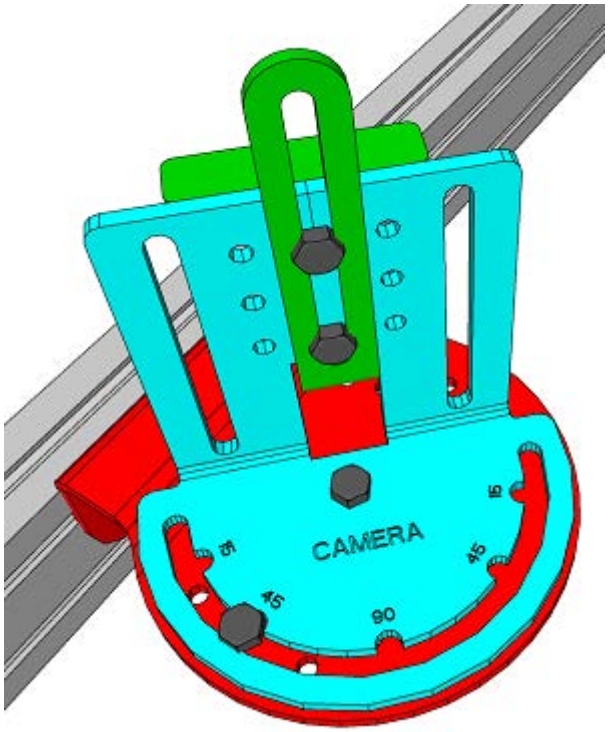
AV7000 Bracket Angles

For ease of positioning, insert the center bolt and tighten so you feel the illuminator is in place and secure, but you can still rotate the bracket to its correct angle.

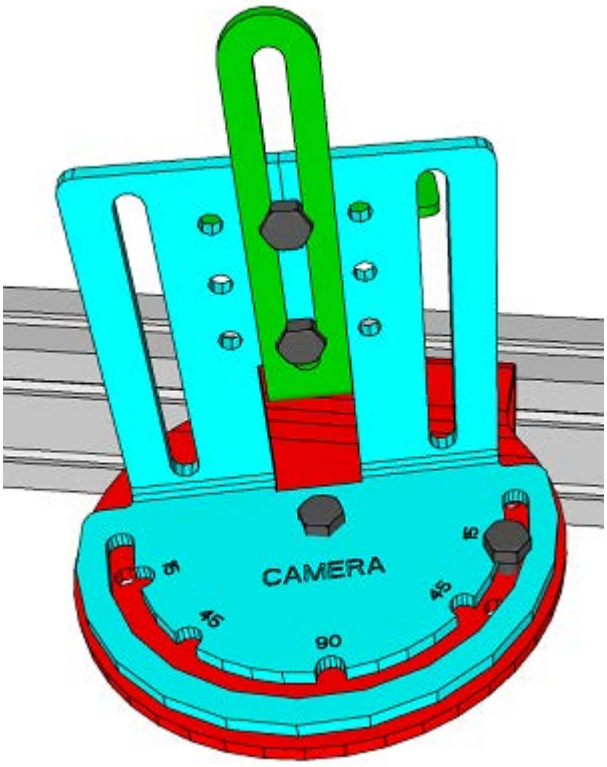
90 Degrees (right, left, top and bottom)



45 Degrees (right, left, top and bottom



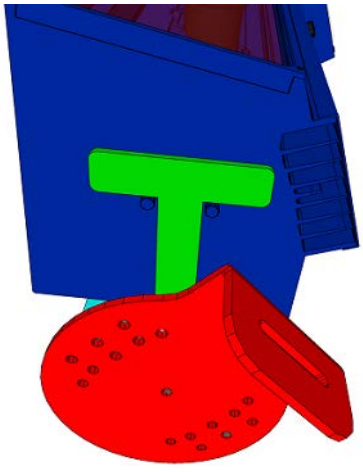
15 Degrees (right, left, top and bottom)



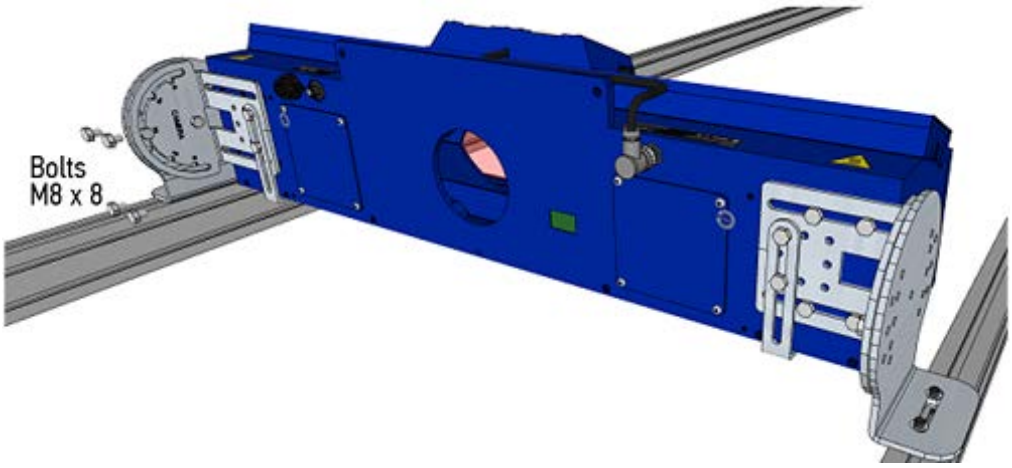
Mount Illuminator to Bracket

After the brackets are in position and properly angled you can attach the illuminator.

1. Place locating slots on bottom of illumination over locating pins.



2. When bracket assembly is in position insert illumination mounting bolts.
3. Tighten bolts.



Mounting the AV7000 Camera to the AI7000 Illuminator

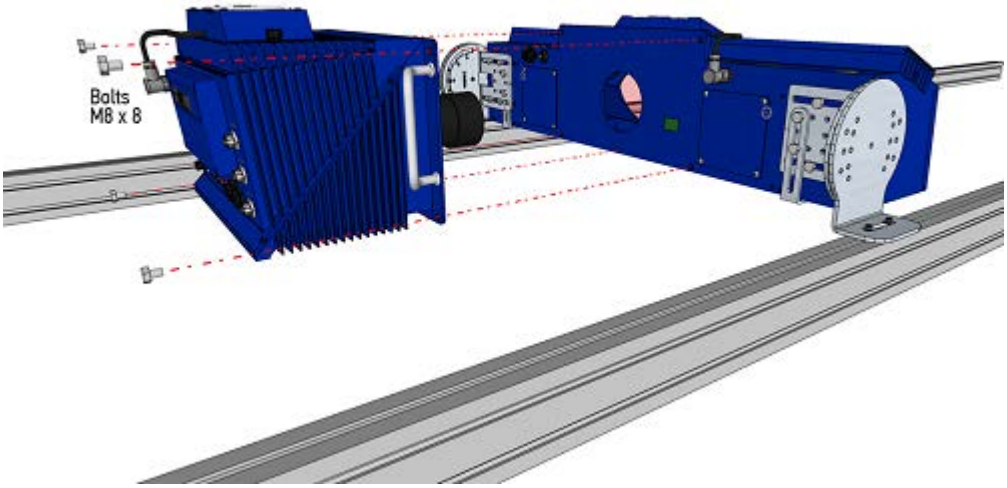
The AV7000 can be installed to operate in any position and the AI7000 Illuminator can be used for any installation; refer to reading diagrams any application drawings for correct positioning of the camera with respect to the reading zone and camera orientation. Typically, the illuminator is mounted to the system mounting structure, and then the camera is bolted to the illuminator.

Mounting the Camera to the Illuminator

After the cooling fan has been installed on the camera housing, the camera can be mounted to the illuminator as follows:

1. Make sure the illuminator is firmly mounted to the mounting structure.
2. Remove the dust cap from the lens access on the back of the illuminator.

3. Lift the camera into place, inserting the lens through the lens hole and the Locater Pin into the Locater Pin Hole. **See illustration below.**



4. Push the camera in place against the back of the illumination and secure it by turning a mounting bolt through the camera housing and into one of the mounting holes in the illuminator. Finger-tighten the bolt for now to secure the camera and prevent it from slipping out of the illumination.

NOTE: The spring-loaded Focus Lock will push against the illuminator creating some resistance. As the bolts are tightened, the Focus Lock is pushed in to release the focusing mechanism.

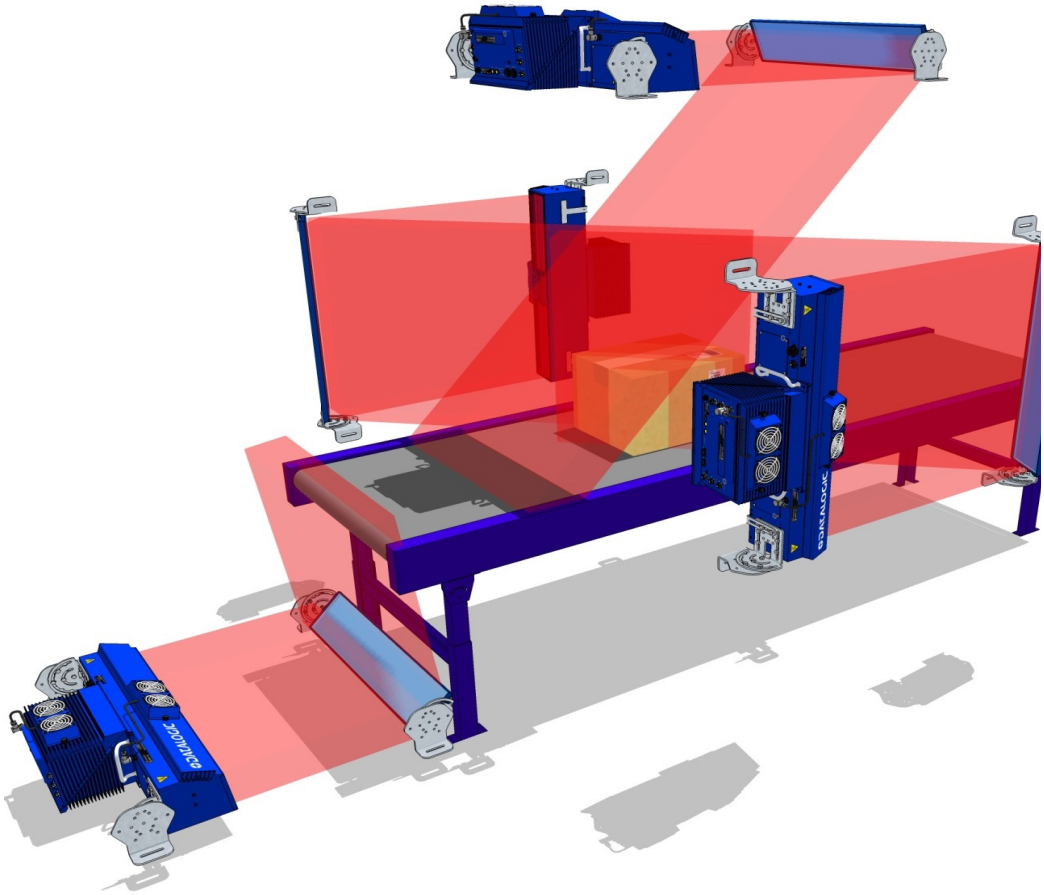
5. Add the remaining bolts, and securely fasten the camera to the illuminator.

Check camera angle positions against application diagrams.

When you are sure all cameras are in the correct angled position, tighten all bolts.

INSTALLING THE DEFLECTION MIRROR

The external deflection mirror allows the AV7000 Camera to be mounted parallel to the conveyor, which can save space while allowing the light from the illuminator and image view to be angled for precise image capture.



NOTE: This illustration does not show the current brackets.

Deflection mirrors are mounted much like the illuminations, and use the same Rising Bracket, with a modified Main Bracket. The illustration below shows bracket assembly and mounting positions relative to the mounting structure. The illustration shows mirrors angled for 45-degree reflective angles, except for the bottom-read mirror, which is angled for an 8-degree reflective angle (off vertical).

MIRROR MOUNTING SEQUENCE

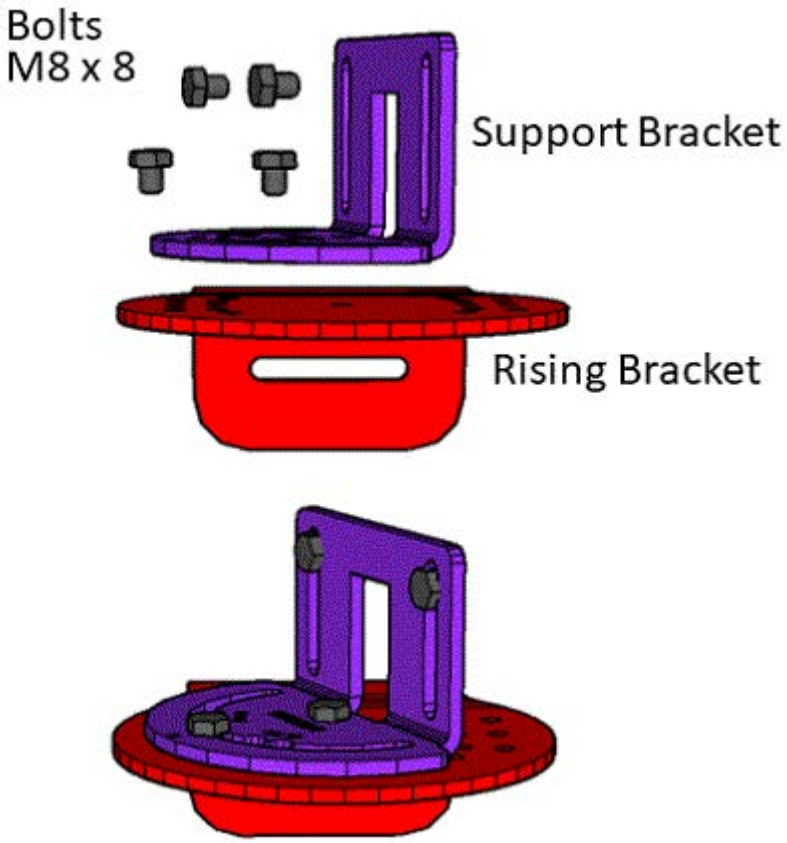
1. For all mounting positions, pre-assemble the EMK supporting bracket to the Rising Bracket in the horizontal position so that it can support the EMK mirror.
2. Bolt the bracket to the mounting structure.
3. Bolt the mirror onto the bracket.
4. Tighten bolts.
5. Loosen the two bolts shown and rotate the mirror to the correct angle

MIRROR BRACKET PRE-ASSEMBLY

Mounting brackets are designed for quick and simple mounting. These brackets can be mounted in all configurations. Reference slots for all standard mounting angles can be made without the use of special tools.

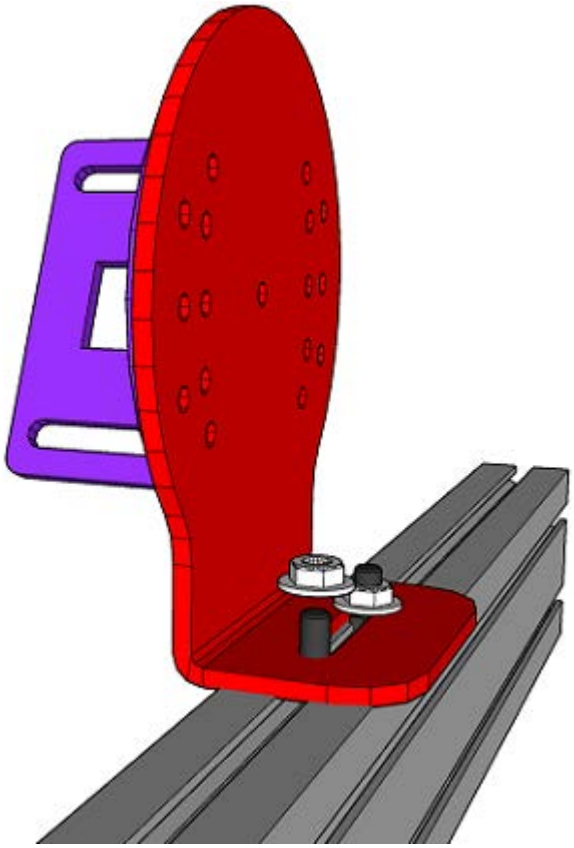
The Mirror Bracket kit included with the Camera contains all you need.

Top or side mount mirror positions require the following pre-assembly of the bracket.



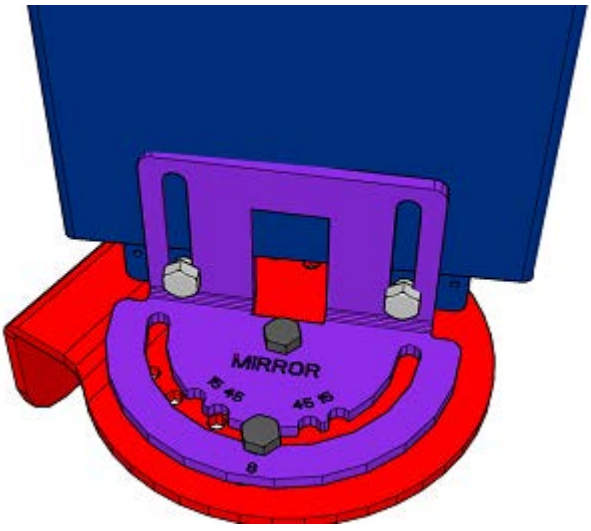
Bolt the Bracket to the Mounting Structure

Bolt the Rising bracket to the mounting structure with T-bolts, as shown.

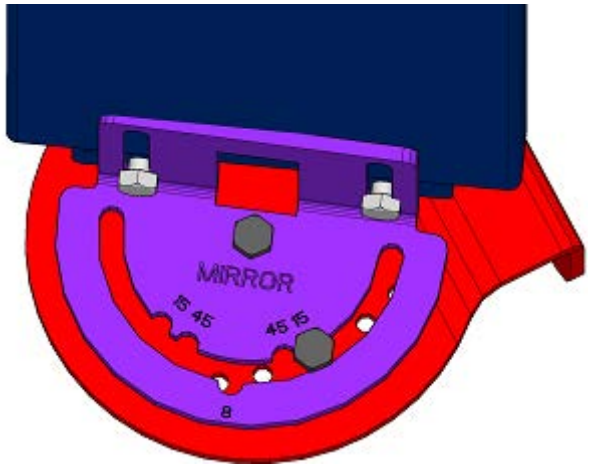


Bolt AV7000 Mirror to Main Bracket

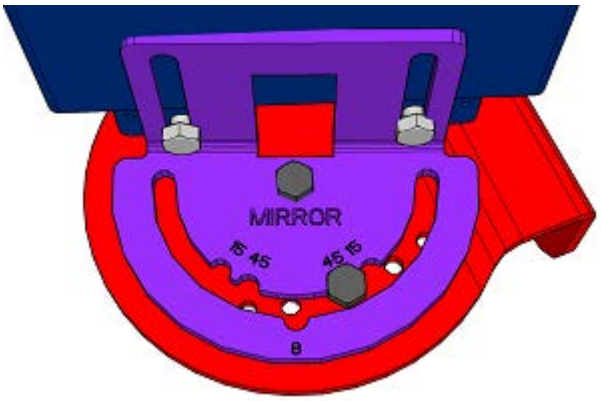
Attach the mirror to the main bracket and tighten. For ease of positioning, make sure the center bolt is tightened so you feel the mirror is in place and secure, but you can still rotate the bracket to its correct angle.



8 degrees



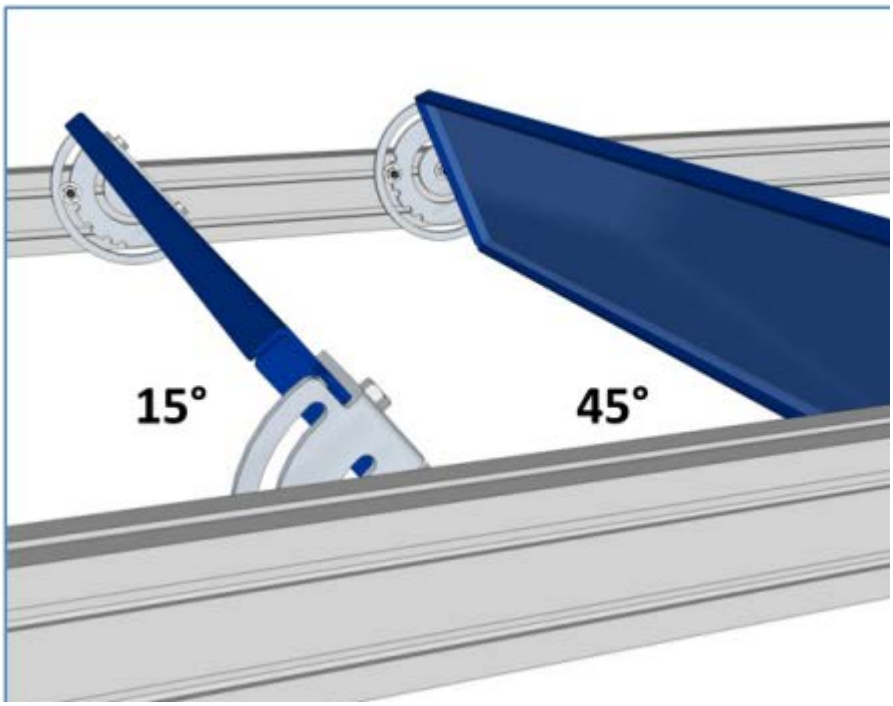
15 degrees



45 degrees

Alternative Deflection Mirror Mounting Between Rails

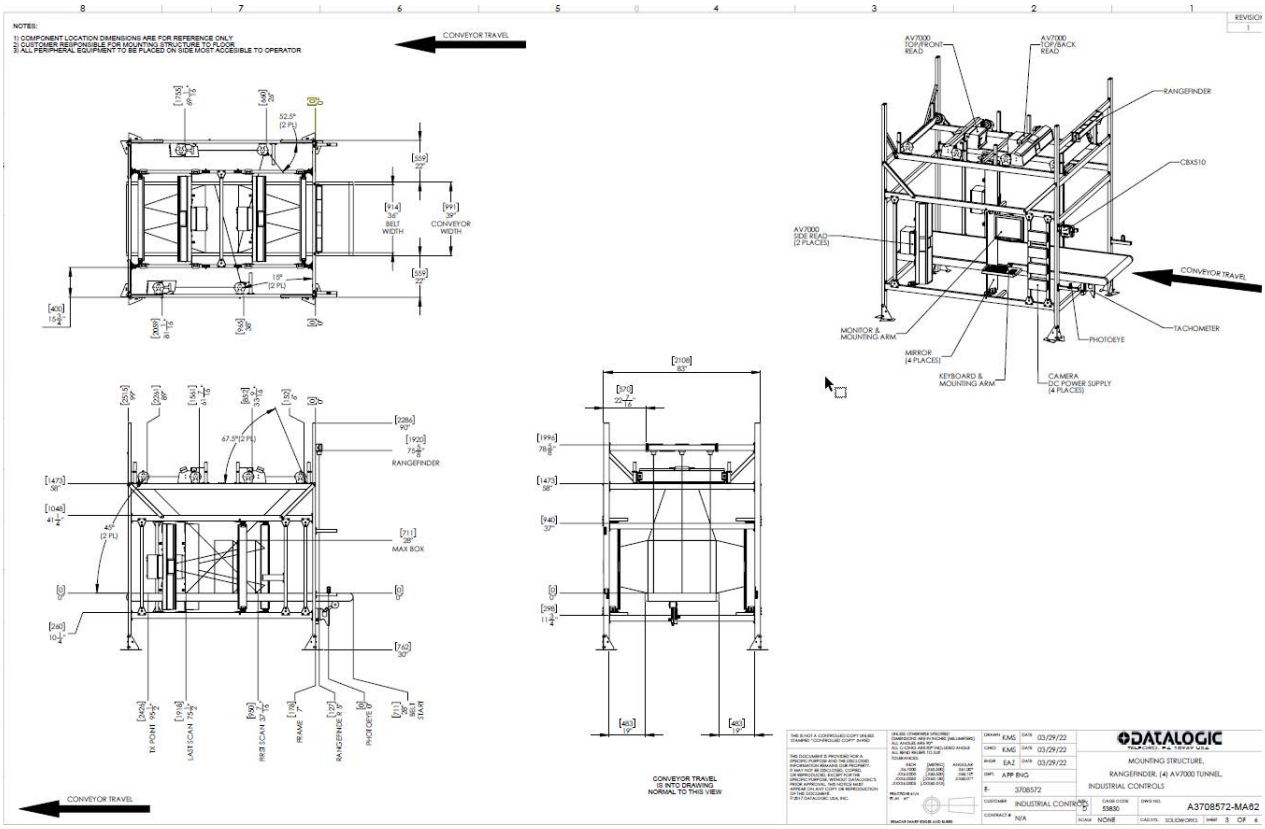
Like the AV7000 Camera, the deflection mirror can also be mounted between the mounting structure rails, as illustrated below.



ALIGNING THE AV7000 WITH DEFLECTION MIRRORS

When using deflection mirrors with the AV7000 reader, which is typical, the mirrors must be mounted parallel to the reader and at the correct distance to allow for proper focus and the highest read rate. Reference the system's application drawing.

Below is a sample of one of the many diagrams that come with your application specific drawing package.



When mounting the readers and mirrors, make sure:

- the structure is centered and squared to the conveyor
- deflection mirrors and readers are perpendicular to the structure rails
- deflection mirrors are parallel to their AV7000
- deflection mirror does not twist when mounted

CHAPTER 3
ELECTRICAL INSTALLATION

ESD CAUTION: The AV7000 contain electronics that may be affected by electrostatic discharge (Electrical Installation must be performed by Qualified Service Technicians Only! Procedures may involve exposure to high-voltage. A trained and authorized technician must perform these procedures. Do not attempt to perform any electrical installation procedures unless you are a trained technician.

PREPARING FOR ELECTRICAL INSTALLATION

Before mounting any components, please do the following:

- Read all instructions before beginning your installation.
- Observe all electrical safety requirements discussed in the Introduction to this manual.
- Define and confirm the accuracy of your application's requirements.
- Review all installation-specific drawings.
- Review and plan the power requirements for your application.
- Review and plan the communications requirements for your application.

WARNING: The content of this manual may be superseded by any customer-specific documentation provided by Datalogic. Before proceeding with any installation procedures, be sure to review ALL documentation, especially content that contains details specific to your installation.

NOTE: Everything should be MECHANICALLY INSTALLED before performing any ELECTRICAL INSTALLATION. See Chapter 2 for mechanical installation details.

Most AV7000 applications are shipped with the CBX connection box and all the necessary cabling required to electrically install the system. If your system requires custom-length cables or other special wiring, documentation specific to these requirements has been provided in your shipment. This special documentation supersedes any contradictory content in this manual.

To reduce the possibility of damage to the unit, check all cabling between the AV7000 camera and other devices for accuracy.

CONNECTING AN AV7000 CAMERA

To install an AV7000, follow this sequence:

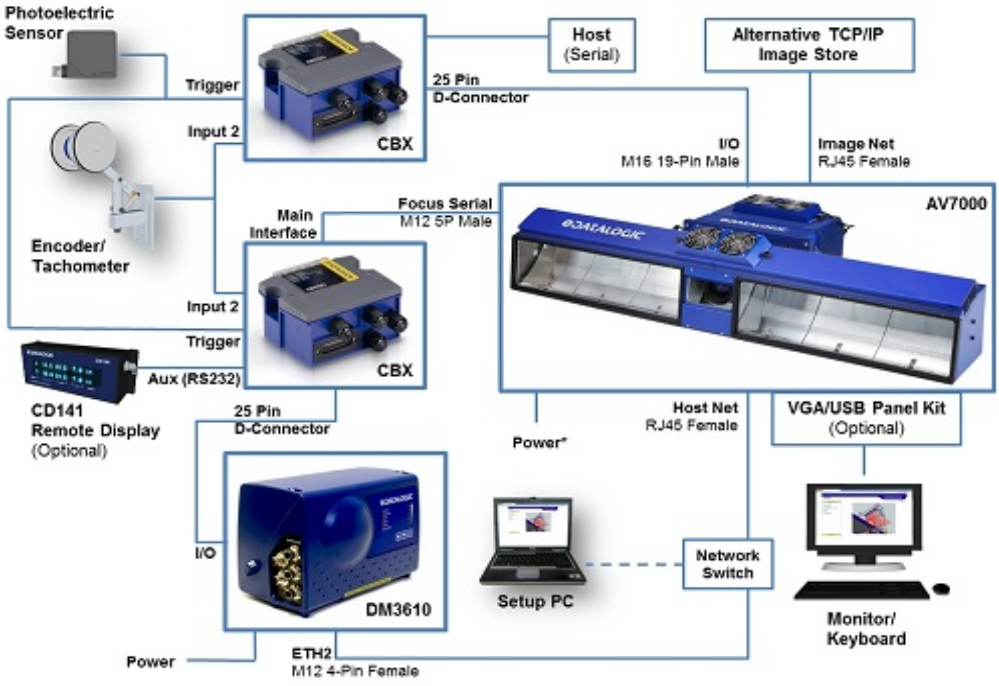
1. Complete mechanical installation.
2. Complete electrical installation (See wiring diagrams in this chapter).
3. Observe all electrical safety requirements outlined in this chapter.
4. Ground the mounting structure to protective earth (PE) ground.
5. If used, wire the photoelectric sensor (or other trigger) and the focusing device (Light Curtain, S85, DM3610 or RangeFinder) to the CBX connection box.
6. Wire the tachometer to the CBX connection box.
7. Wire serial ports to the CBX connection box if needed.
8. Connect the M12 end of the Ethernet cable to the barcode reader's Host Net port and network switch as required by your application.
9. Wire the Remote Display to the CBX connection box (if used).
10. Connect the AV7000 to its power supply.
11. Connect the power supply to the power source.
12. Setup / check camera operations.

TYPICAL CONNECTION BLOCK DIAGRAMS

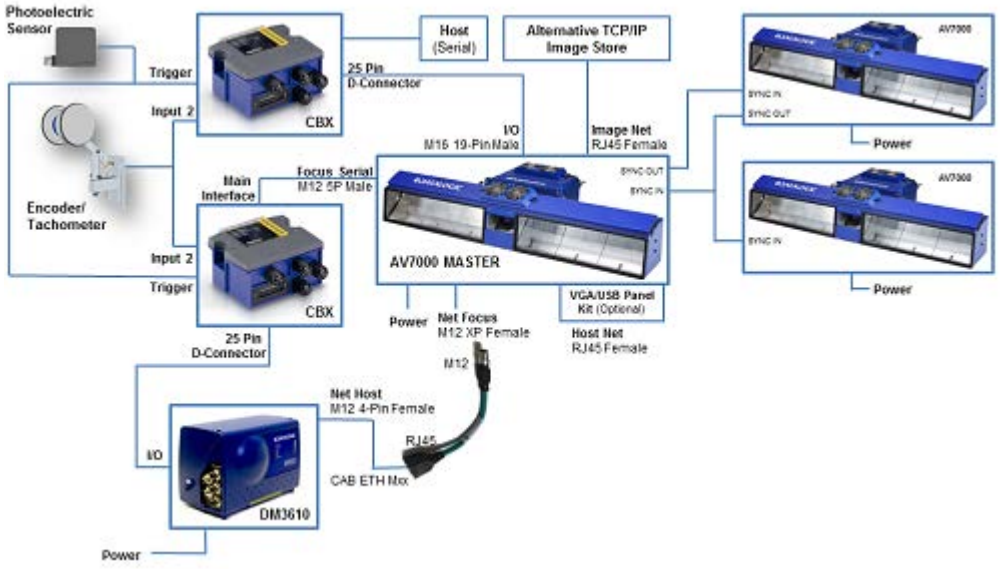
NOTE: In each diagram below a Speed Detector may take the place of the encoder when a tilt-tray or cross-belt conveyance is used.

A CBX510 Connection Box can be used in place of the CBX100 Connection Boxes shown in the following block diagrams.

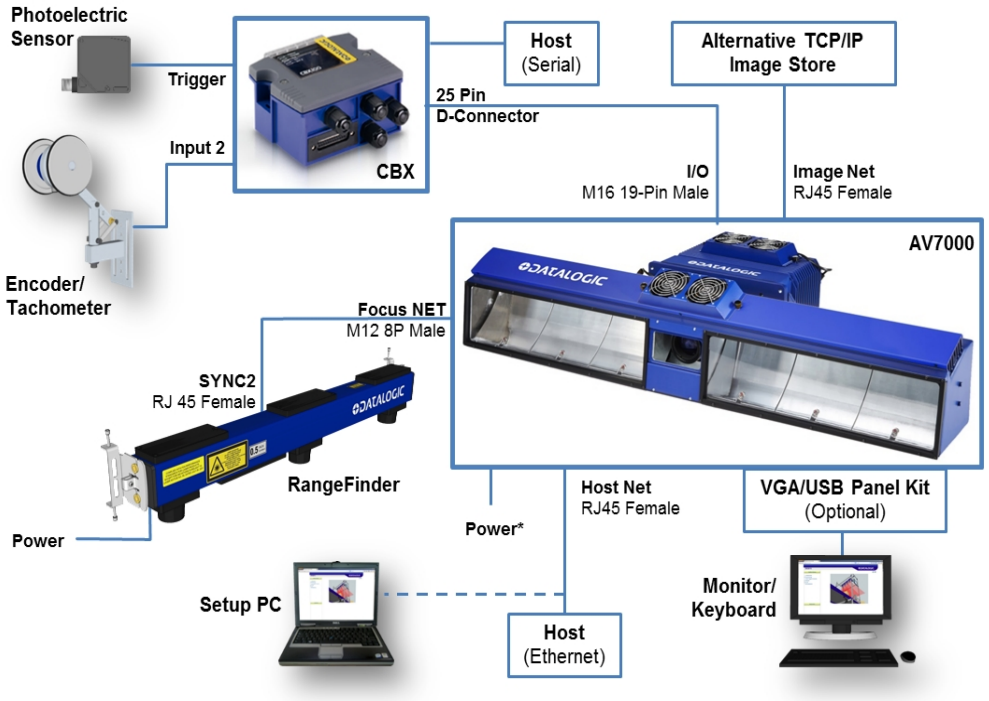
Single Head AV7000 with DM3610



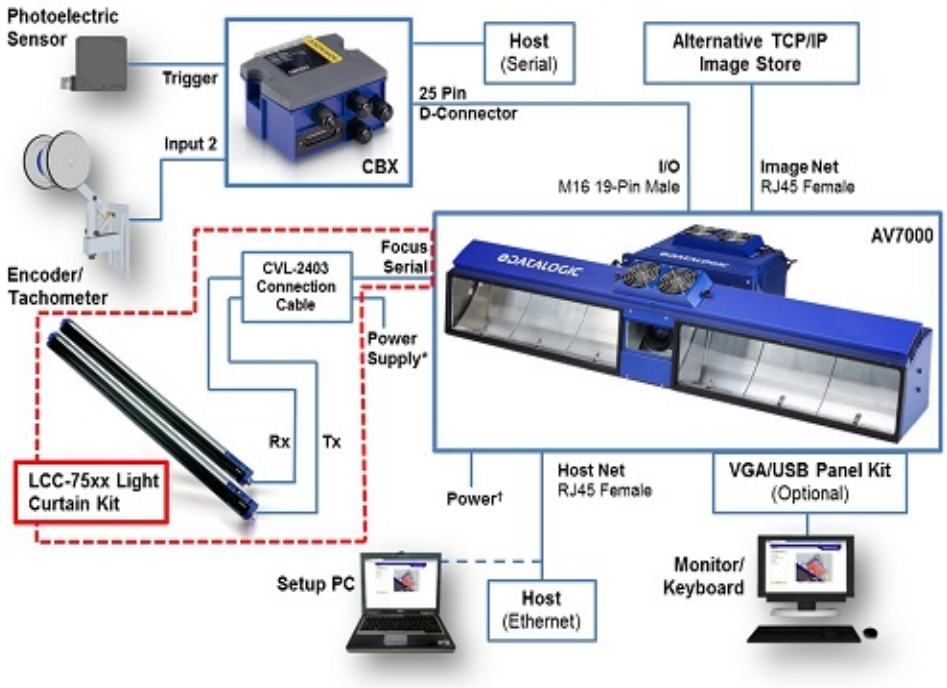
Easy DM3610 and AV7000



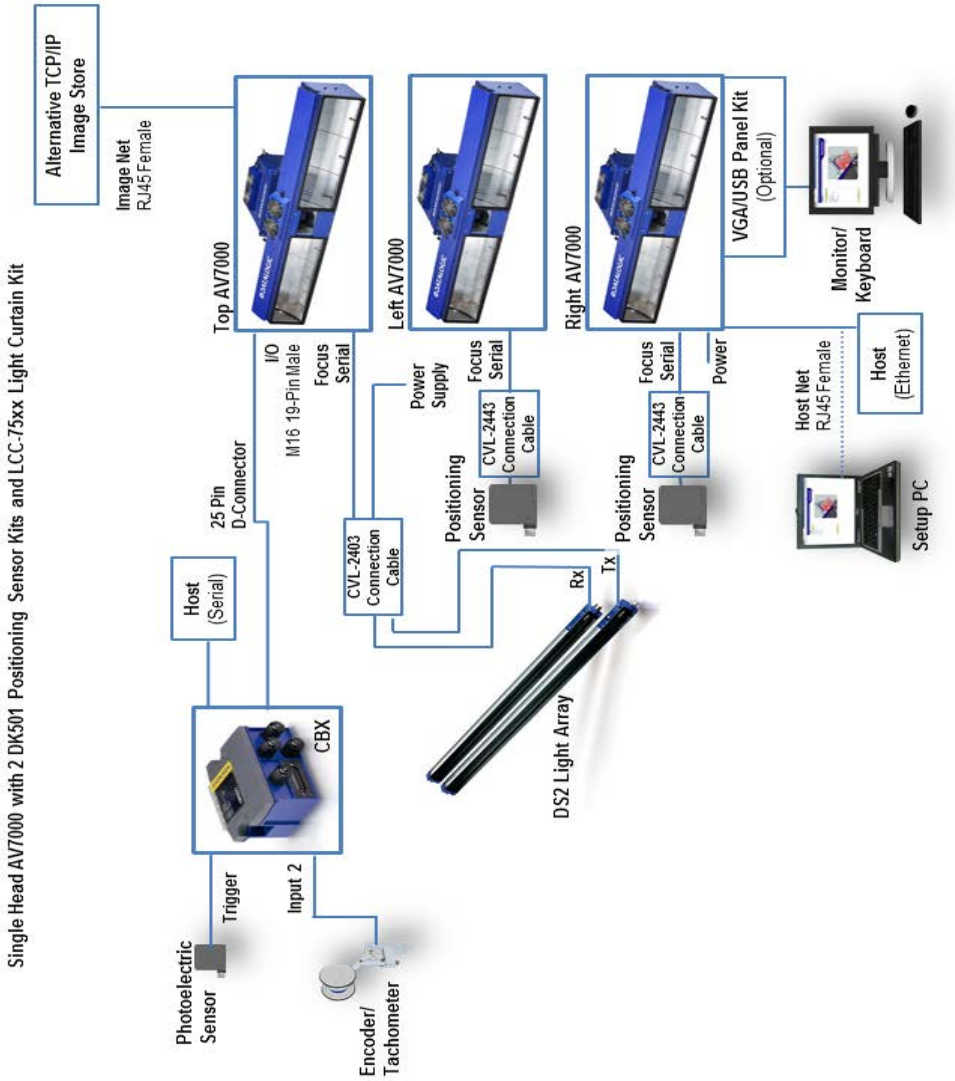
Single Head AV7000 with RangeFinder



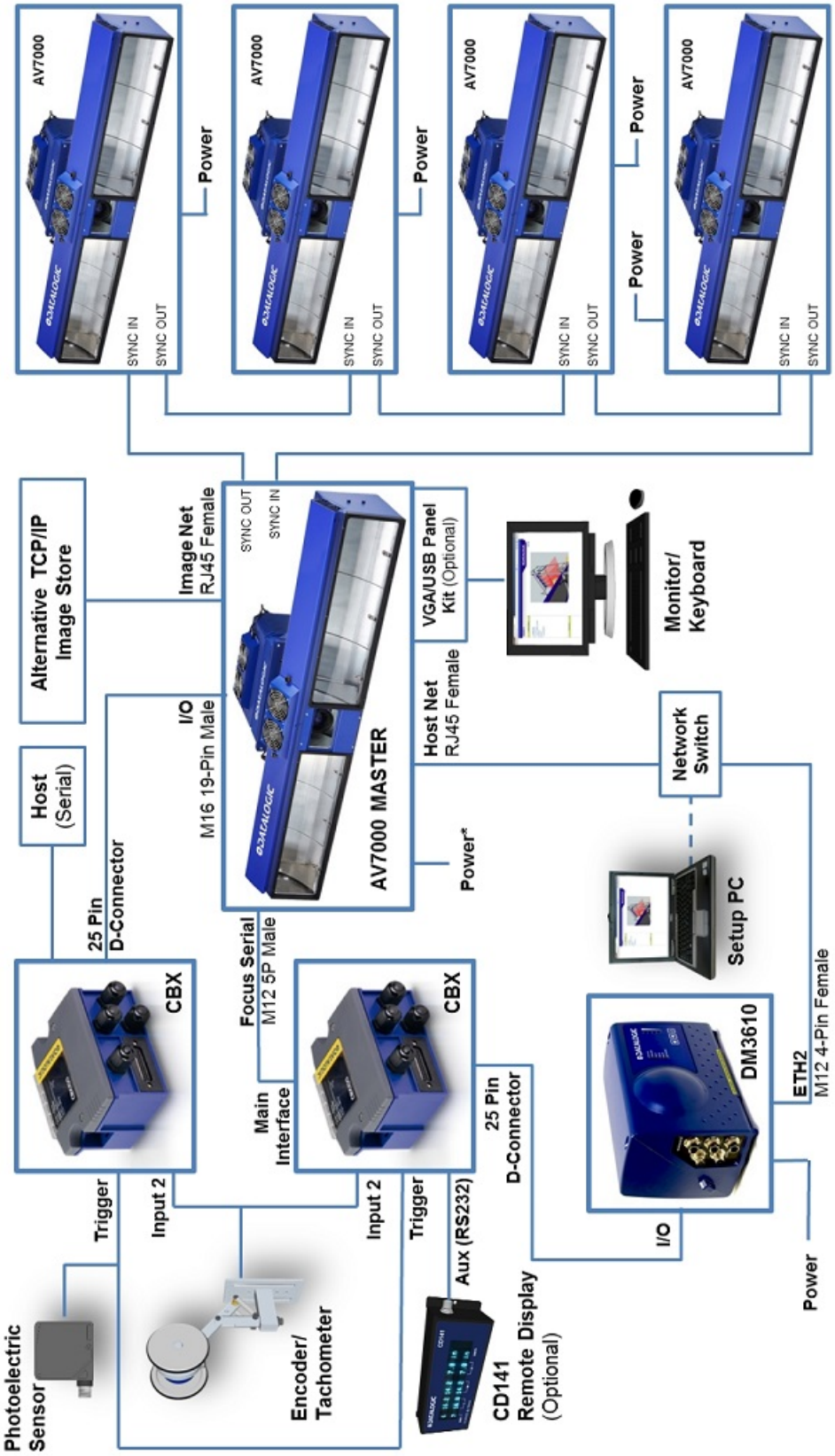
Single Head AV7000 with LCC-75xx Light Curtain Kit



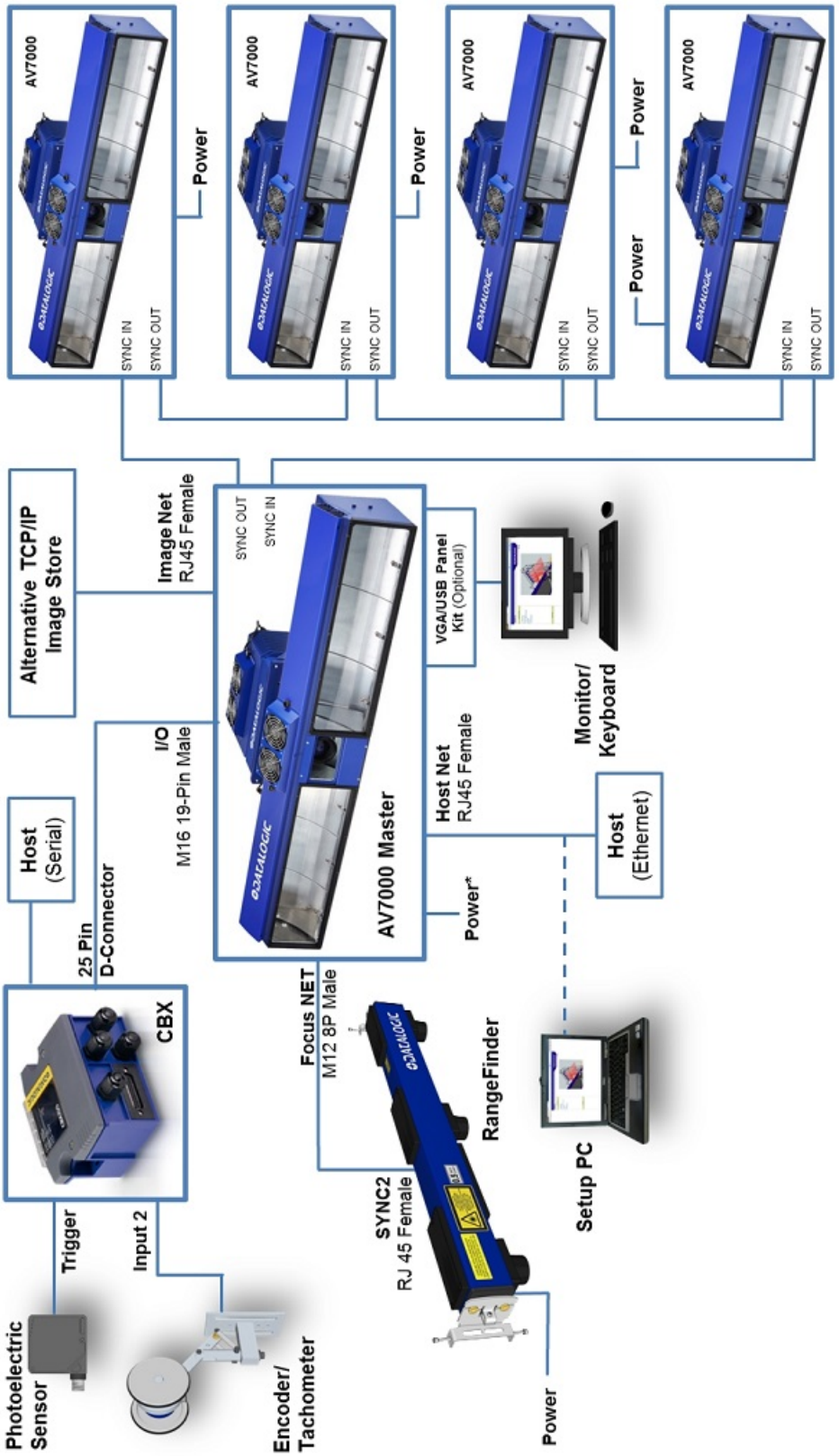
Multi-Head AV7000 with Two DK502 Sensors and LCC-75xx Light Curtain



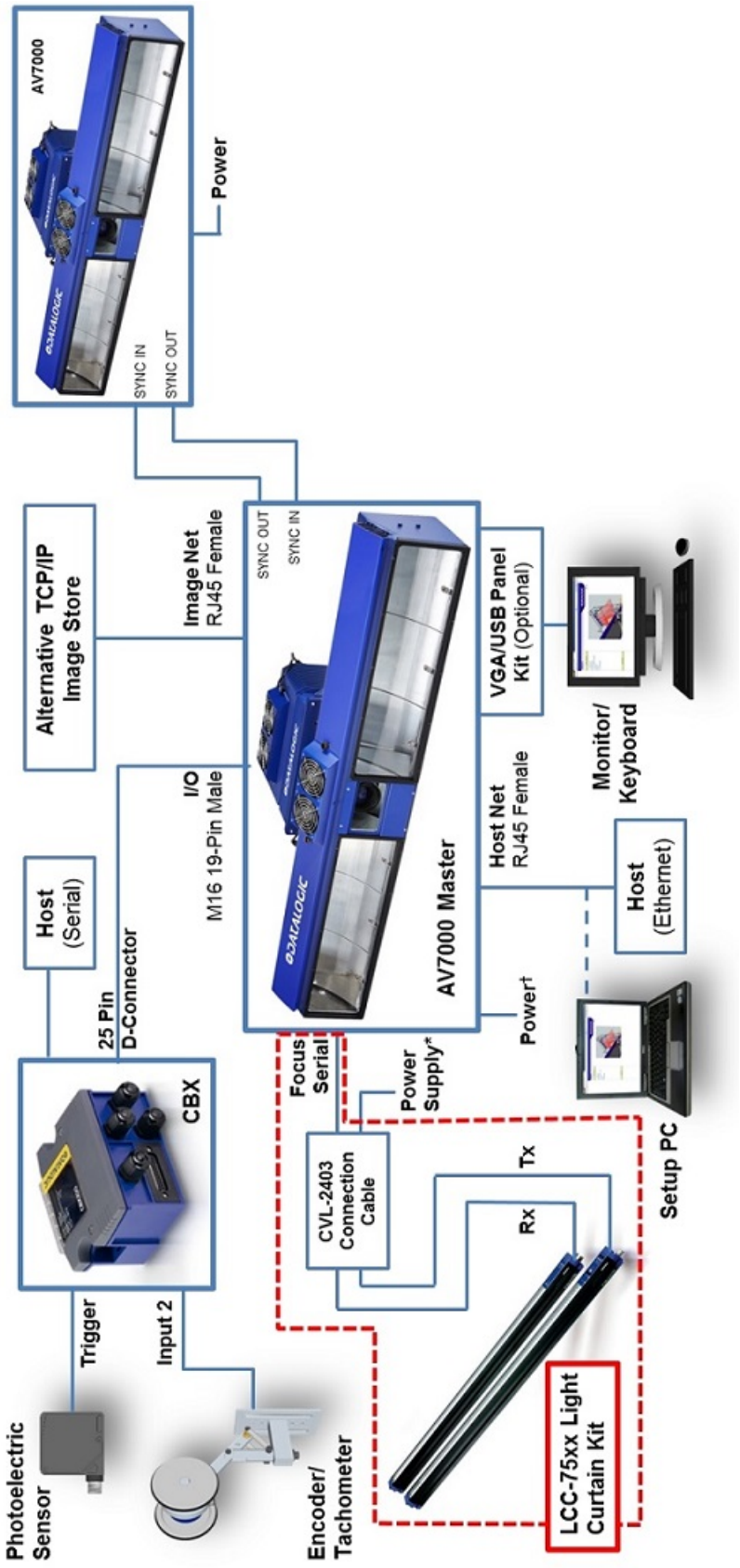
Controller/Client Array with DM3610



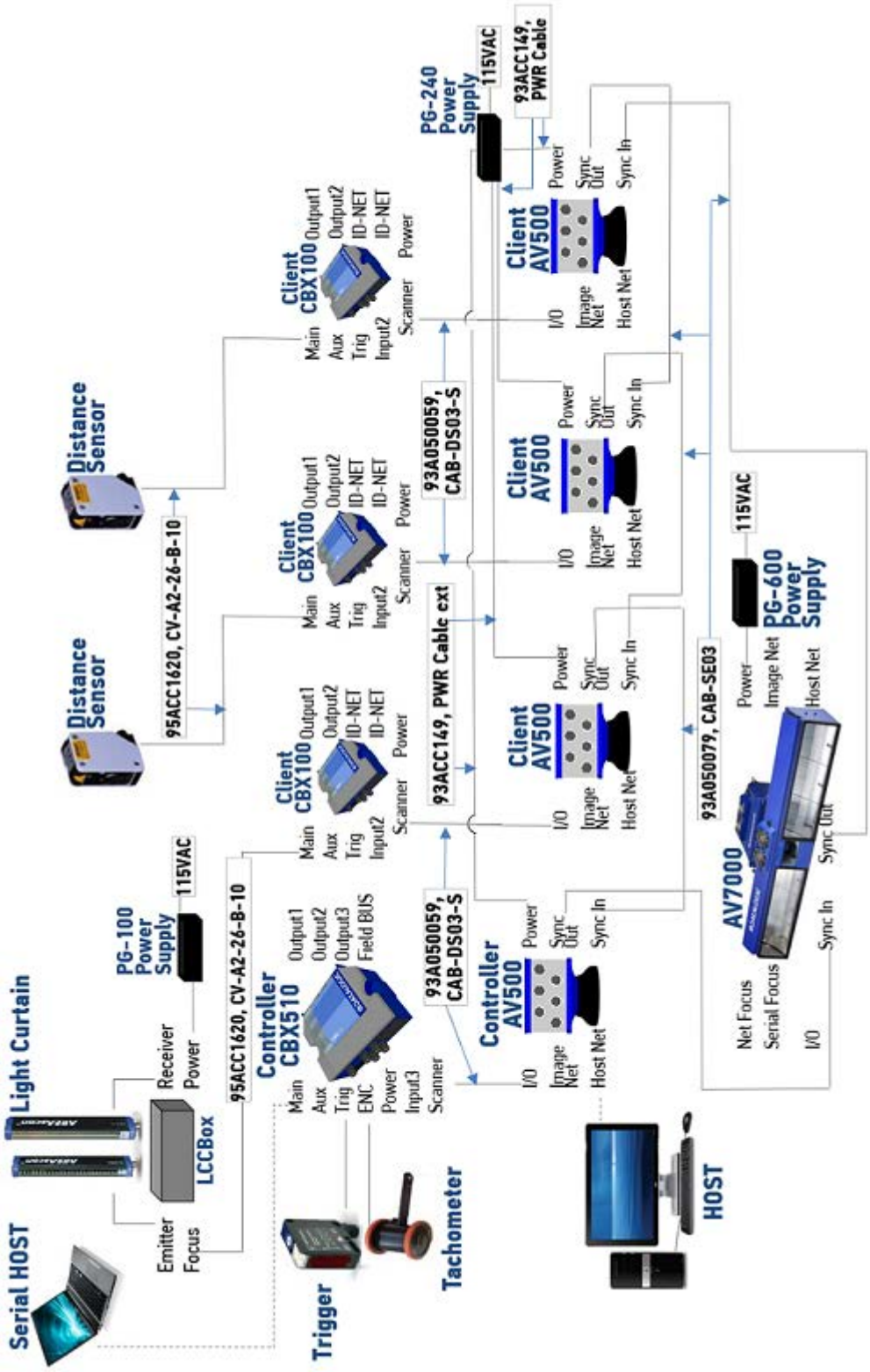
Controller/Client Array with RangeFinder



Controller/Client Array with LCC-75xx Light Curtain Kit

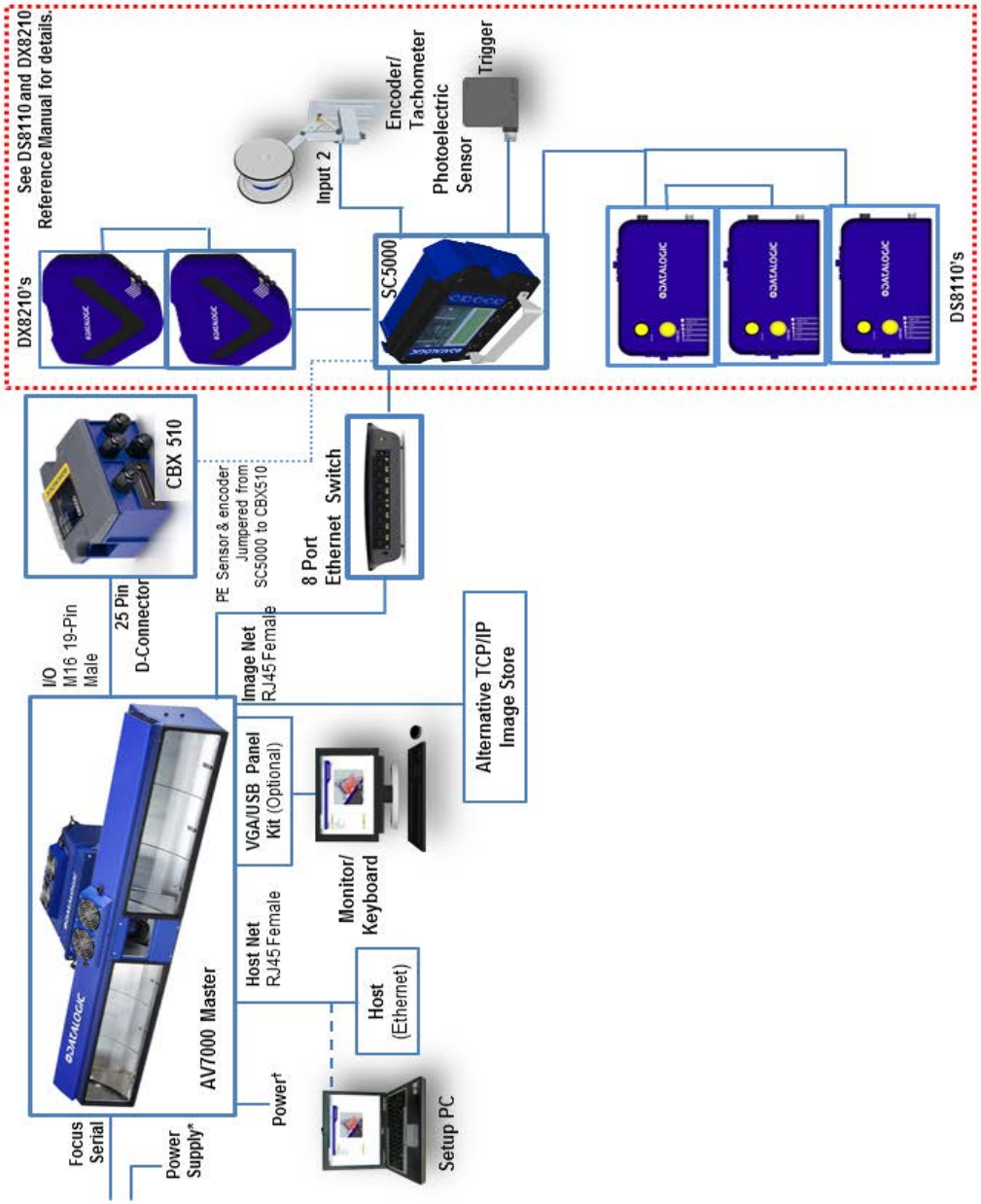


AV7000 and AV500 in SyncNet Configuration



NOTE: SyncNet in large AV tunnels must have a completed loop. Sync cables must be kept as short as possible. Failure may cause tachometer errors in the tunnel

AV7000 in Hybrid Configuration



ELECTRICAL INSTALLATION GUIDELINES

It is important that you follow these general precautions when installing, setting up, operating, maintaining, troubleshooting or replacing any Datalogic products, parts or related equipment.

As you plan and install your barcode reader(s), be sure to keep the following guidelines in mind:

- Determine the camera is in the proper location as outlined in Chapter 2.
- Leave adequate clearances (approximately 300mm [12 in]) for wiring.
- Route wires carefully to reduce or minimize electrical noise.
- When extraneous power and communication wiring must cross, make their intersection perpendicular. Avoid running power and data wiring parallel to each other. If possible, maintain one of the following separations between the power and data wiring:
- 300 mm [12 in] gap
- use steel conduit and 25 mm [1 in] gap
- 6.5 mm [0.25 in] of aluminum.

WARNING: When planning your installation wiring, remember all power connections must be quick-disconnect. For PERMANENTLY CONNECTED EQUIPMENT a readily accessible disconnect device must be incorporated in the building installation wiring. For PLUGGABLE EQUIPMENT the socket-outlet must be installed near the equipment and must be easily accessible

To assure no ESD damage will occur, be sure to observe the precautions outlined in the Introduction to this manual.

Ground the mounting structure to safety ground (protective earth ground (PE)).

AV7000/AI7000 CONNECTOR PANELS

After completing mechanical installation, use this section to properly wire your cameras for optimal performance in your application. AV7000 wiring connections are made to the connector panel and through the CBX connection box (via the I/O port). In most applications, the cable connections to the barcode reader will include:

AI7000 Illumination

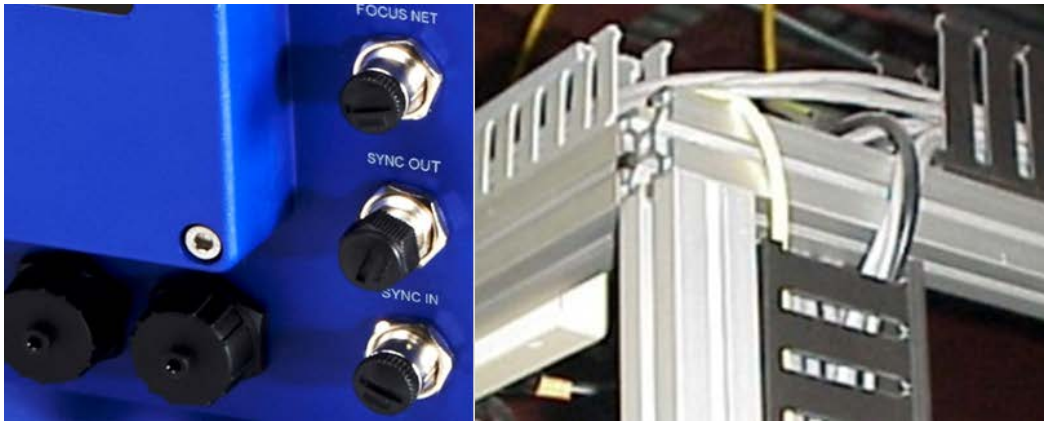
1. **POWER IN** – Main DC power connection for AV7000/AI7000 assembly
2. **POWER OUT** – Supplies DC power via cable to POWER connector on AV7000
3. **FANS** – Supplies DC power to AI7000 illumination fan units

AV7000 Camera

4. **FAN** – Supplies DC power to AV7000 fan unit
5. **I/O** – Provides connection to CBX Connection Box
6. **FOCUS SER** – Provides serial focus data to the camera (ex. light curtain, S85)
7. **POWER** – Connector receiving power from AI7000 POWER OUT
8. **USB1** – OPTIONAL USB Keyboard and Mouse connection
9. **VGA** – OPTIONAL Monitor connector
10. **HOST NET** – Configuration and dimensioning data from the DM3610 if used
11. **IMAGE NET** – Configuration, Remote Monitor application, or image export
12. **SYNC IN** – AV7000 internal data, device network
13. **SYNC OUT** – AV7000 internal data, device network
14. **FOCUS NET** – Network focus data (RangeFinder)

WARNING: If a connector is not in use, it should always be covered with its protective cap.

Route wiring from the barcode reader's connector panel through the wiring channels (if available) on the Datalogic mounting structure when interconnecting cables to other devices.



CONNECTING A PC TO THE AV7000

During initial setup, a PC (laptop) may be connected to the AV7000 with an RJ45 cable. Connect an Ethernet cable from the **HOST NET** or **IMAGE NET** port of the AV7000 to the Ethernet port of your PC. For information on connecting to e-Genius, see Chapter 4.

NOTE: Parameters for tunnel are set up in the MASTER AV7000 only.

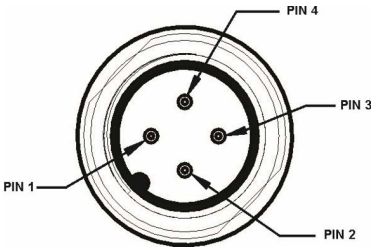
IP Address for HOST NET and IMAGE NET are as follows:

HOST NET – 192.168.3.10

IMAGE NET – 10.0.40.20

POWER CONNECTOR PIN-OUT TABLE (CUSTOM POWER SUPPLY)

A recommended power supply and cabling is available for the AI7000 Illumination, which then supplies the AV7000 Camera. However, if your installation requires custom power supply wiring, the pin-outs of the AV7000 camera power connector are provided below.

<table>
<tr><td colspan="2" rowspan="3">24V - - - 4A MAX</td><td colspan="2">POWER Input</td></tr>
<tr><td>Unit Connector (shown)</td><td>Mating cable connector</td></tr>
<tr><td>4-PIN M12-TYPE MALE</td><td>4-PIN M12-TYPE FEMALE</td></tr>
<tr><td rowspan="5">MALE 4-PIN M12-TYPE
 
</td><td>Pin</td><td>Name</td><td>Function</td></tr>
<tr><td>1</td><td>GND</td><td>Input Power Ground</td></tr>
<tr><td>2</td><td>+24 VDC</td><td>Input Power + 24Vdc</td></tr>
<tr><td>3</td><td>+24 VDC</td><td>Input Power + 24Vdc</td></tr>
<tr><td>4</td><td>GND</td><td>Input Power Ground</td></tr>
</table>

NOTE: When using an AI7000 Illumination and AV7000 Camera, no power supply is required for the CBX connection box. All power and some communication options are fed to the CBX through the AV7000's 19-pin I/O connector to the CBX 25-pin connector using the cable provided.

POWER CONNECTIONS

WARNING: When planning your installation wiring, remember all power connections must be quick-disconnect. The socket-outlet must be installed near the camera. The outlet must be a readily accessible disconnect device.

While performing the following wiring connection procedures, be sure to follow all safety procedures regarding high-voltage as outlined in the Introduction to this manual. No power should be applied to any device until all wiring is completed and checked for accuracy.

The CBX connection boxes provide flexible connectivity to a range of I/O devices as well as serial hosting. The AV7000 connects to the CBX via its I/O port using a single 19-pin M16 to 25-pin D cable.

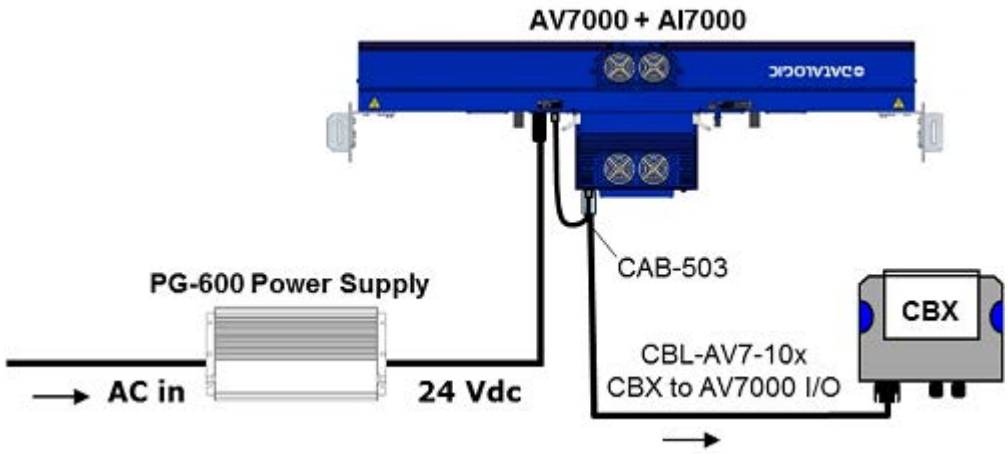
Power Supplies and Supply Capacity When Wiring to AI7000s

There are two Datalogic power supply options.

A **PG-600** is able to power:

One AI7000 illuminator (including the AV7000 camera which is powered via this unit and one CBX510 with all the standard sensors)

The power supply unit is connected to the camera illuminator according to the following diagram (power supply side):



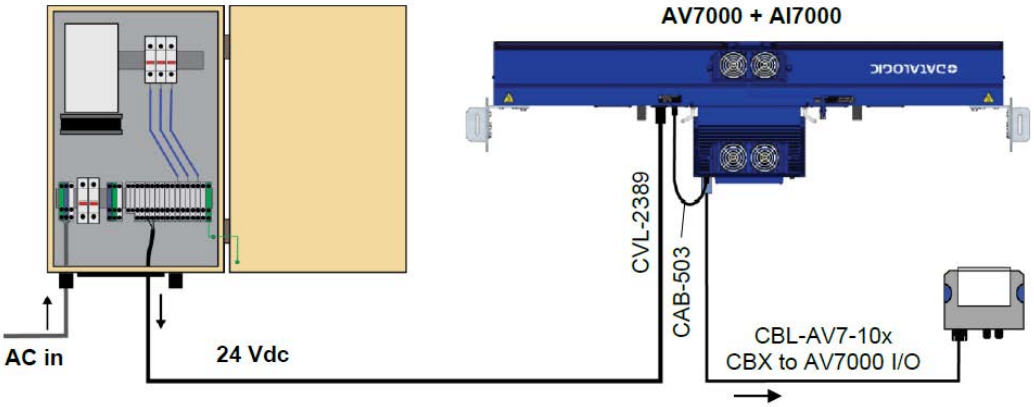
NOTE: If the PG-600 is mounted further than 1 M [3 ft] from the AV7000/AI7000, use the CVL-2389 power extension cable include in the illuminator package.

The CBX510 connection box receives power through the CBL-AV7-10x from the AV7000 IO connector.

A **PWR-480B** is able to power:

One AI7000 illuminator (including the AV7000 camera which is powered via this unit and one CBX510 with all the standard sensors)

The power supply unit is connected to the camera illuminator according to the following diagram (power supply side):



NOTE: The AI7000 series illuminators are supplied with CVL-2389 extension power cable. Use this cable to connect the PWR-480B power supply by cutting off the cable's male Amphenol connector and connecting the wires to the PWR-480B according to the table below:

CVL-2389 Wire Color or Number (Depending on Source)		Function
White	1	GND
Green	2	+ 24 Vdc
Red	3	+ 24 Vdc
Black	4	GND

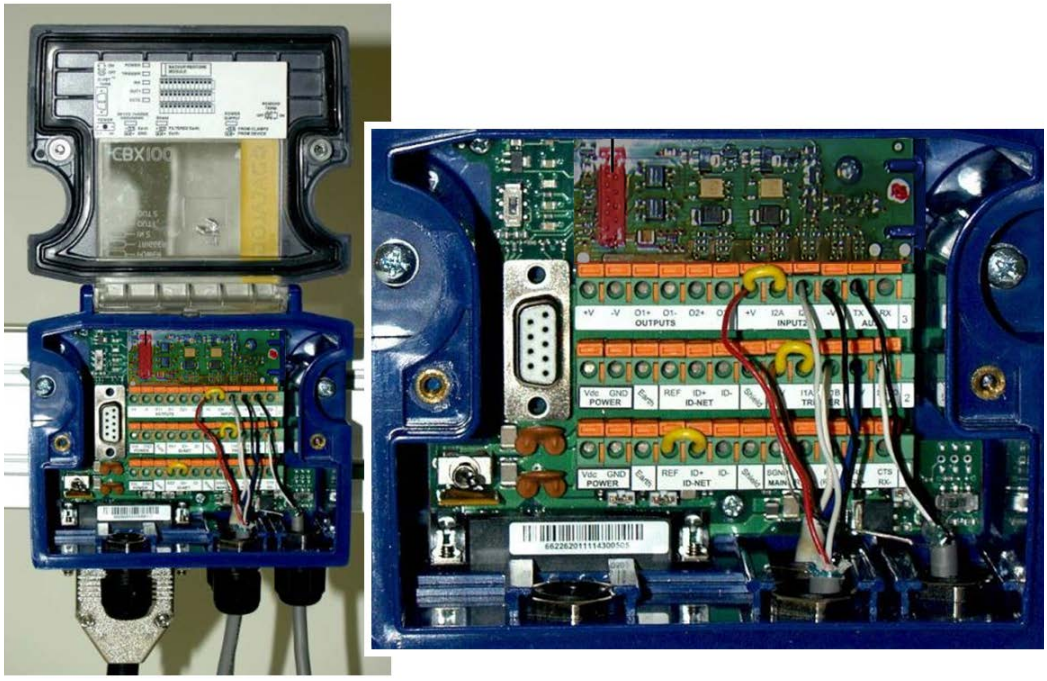
The CBX510 connection box receives power through the CBL-AV7-10x from the AV7000 IO connector.

WIRING INTO THE CBX CONNECTION BOX

WARNING: DO NOT connect a separate power source to the CBX connection box. The CBX receives its power through its connection to the AV7000. Connecting a separate power source will be detrimental to the system operation

As shown below, loose-lead cables must pass through the water-tight seals in the base of the CBX connection box (CBX100 shown). Insert the cables allowing enough slack for the individual wires to reach the appropriate pin block connectors. Securely tighten the water-tight seals after the cables have been inserted.

Insulation on individual wires should be removed to expose 13 mm [0.5 in] of bare metal before inserting into the pin block.



WARNING: If you are terminating more than one wire in a single terminal, cut off any tinned ends and twist the wires together before inserting them into the terminal.

Selecting the Correct CBX Connection Box for Your Application

As shown in *section* , typical applications require a single CBX connection box to connect the trigger and encoder inputs to the master camera. The camera sources power to these devices. Other possible CBX connections are for digital outputs or a serial host.

- **CBX100** - used for slave cameras (and as an alternative for master cameras). It provides general access to digital input/output signals.
- **CBX510** - used for standalone or master cameras. It provides general access to digital input/output signals. It doesn't require special jumpers to set operation or power sourcing.
- **CBX800** - used for Fieldbus communication between standalone or master cameras and a Host. Various Fieldbus modules can be installed in the CBX800. The master camera communicates through its main serial interface to the CBX800 which must be programmed for the specific Fieldbus communication to the Host. It also provides general access to digital input/output signals.

The table below indicates the available options for each recommended CBX Connection Box.

Device	Tach Input	Trigger Input	General Purpose Input	General Purpose Output 1	General Purpose Output 2	Works as a Slave	Works as a Master
CBX100	X	X		X	X	X	with jumper
CBX510	X	X	X	X	X		X
CBX800	X	X	X	X	X	X	with jumper

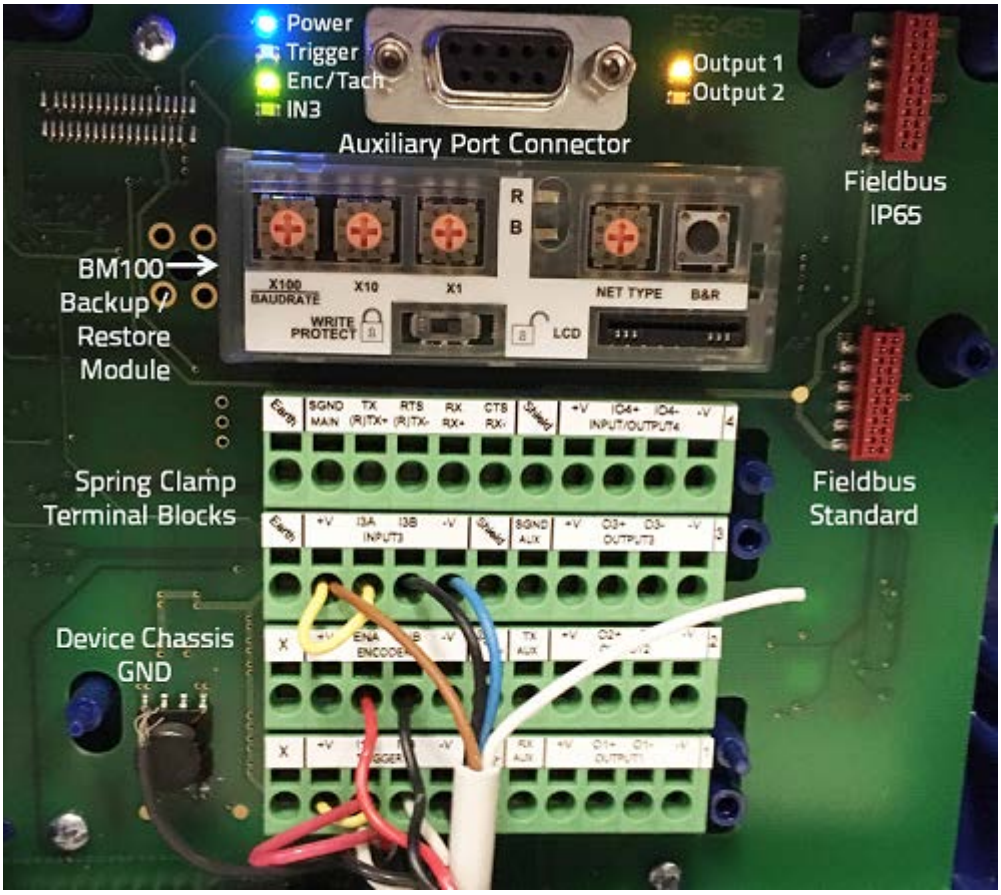
WARNING: Although multiple AV7000 cameras can have a CBX box, only one of the CBX boxes in the system can have the Jumper to make it the Master.

CBX100/CBX510/CBX800 INITIAL CONFIGURATION

Complete installation information on these connection boxes is available in the *CBX100,CBX510, and CBX800 Installation Manuals* available at www.datalogic.com.

CBX510

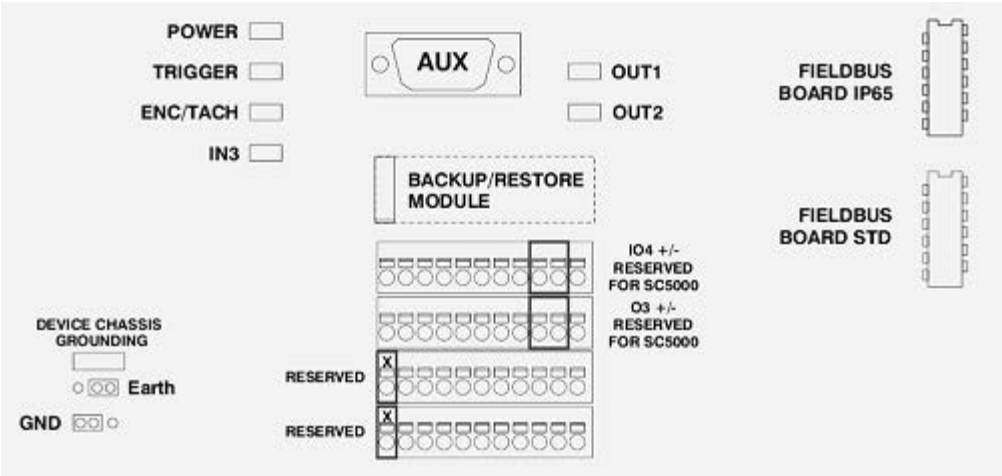
Please verify that the CBX510 connection box is configured for the AV7000 application as follows:



WARNING: If you are terminating more than one wire in a single terminal, cut off any tinned ends and twist the wires together before inserting them into the terminal.

CBX 510 Interior Diagram

NOTE: If you are terminating more than one wire in a single terminal, cut off any tinned ends and twist the wires together before inserting them into the terminal.



Photoelectric Sensor Connections to CBX510

Barcode scanning applications may use a Datalogic photoelectric sensor as a trigger device. The photoelectric sensor is wired directly into the CBX510 terminal block.

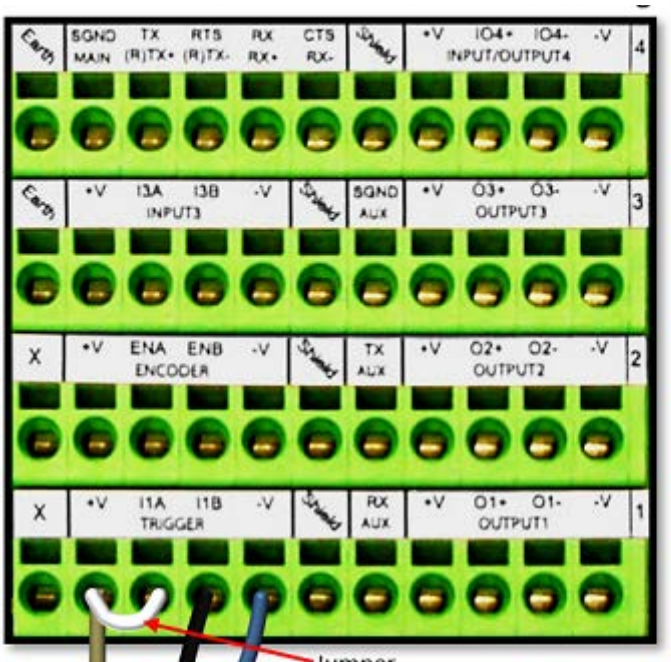
If your application uses a trigger other than the one specified by Datalogic, follow the appropriate wiring diagram to assure proper wiring.

WARNING: You must use shielded interface cables with this product. To maintain FCC compliance, the cable shield must make a 360-degree connection to the shielded mating connector.

NOTE: To confirm the photoelectric sensor is functioning properly, watch the TRIGGER LED in the CBX and also on the camera while the photoelectric sensor's beam is blocked. The Datalogic photoelectric sensor also includes a status LED.

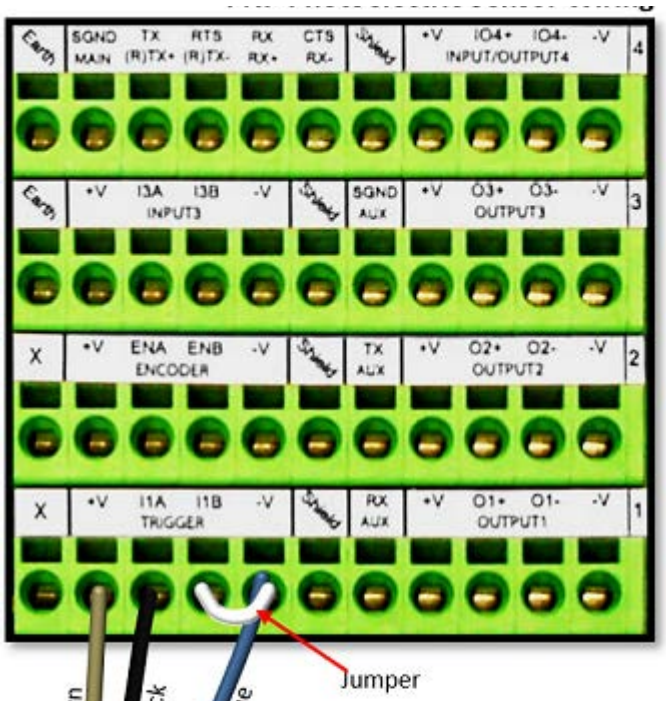
The following diagrams illustrate standard recommended wiring of the Photoelectric Sensor to the CBX510 terminal block.

Photoelectric Sensor to CBX510 (NPN)



Wire Color	
Brown	+V
Black	I1B
Blue	-V
White	Jumper I1A +V

Photoelectric Sensor to CBX510 (PNP)

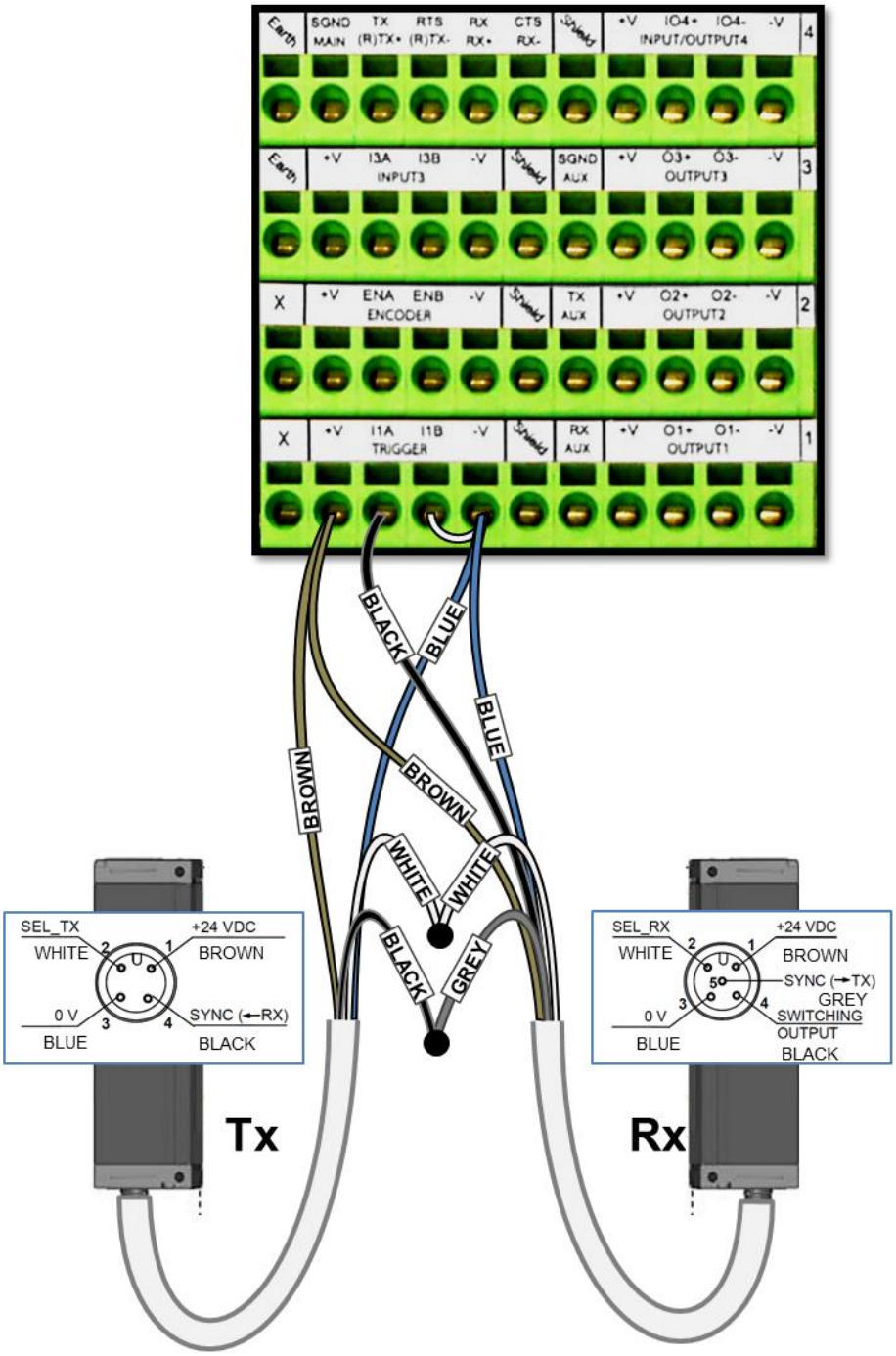


Wire Color	
Brown	+V
Black	I1A
Blue	-V
White	Jumper I1B -V

AS1 Area Sensor to CBX510 Connections

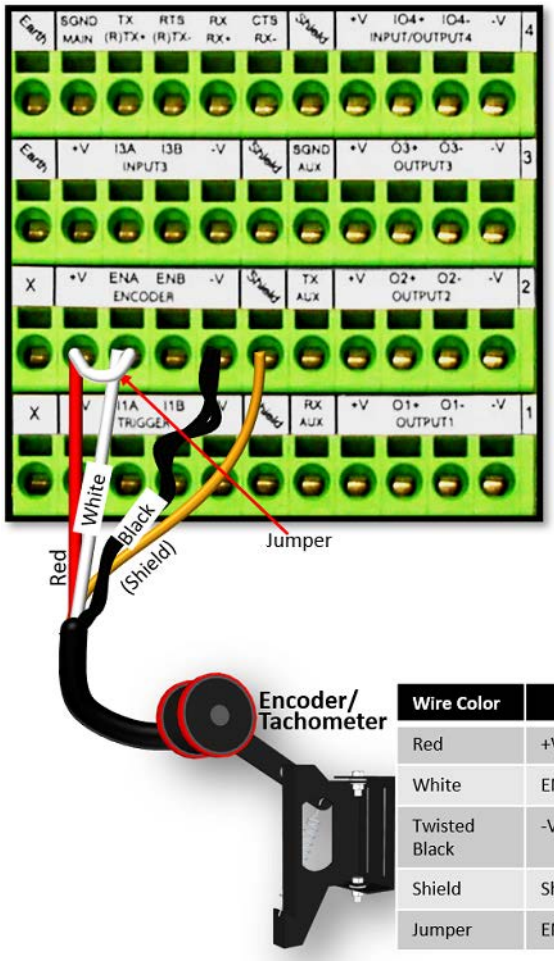
The **AS1** area sensors can detect and provide trigger for very small or irregularly shaped objects.

AS1 Area Sensor (PNP Output)



Encoder/Tachometer Wiring to CBX510

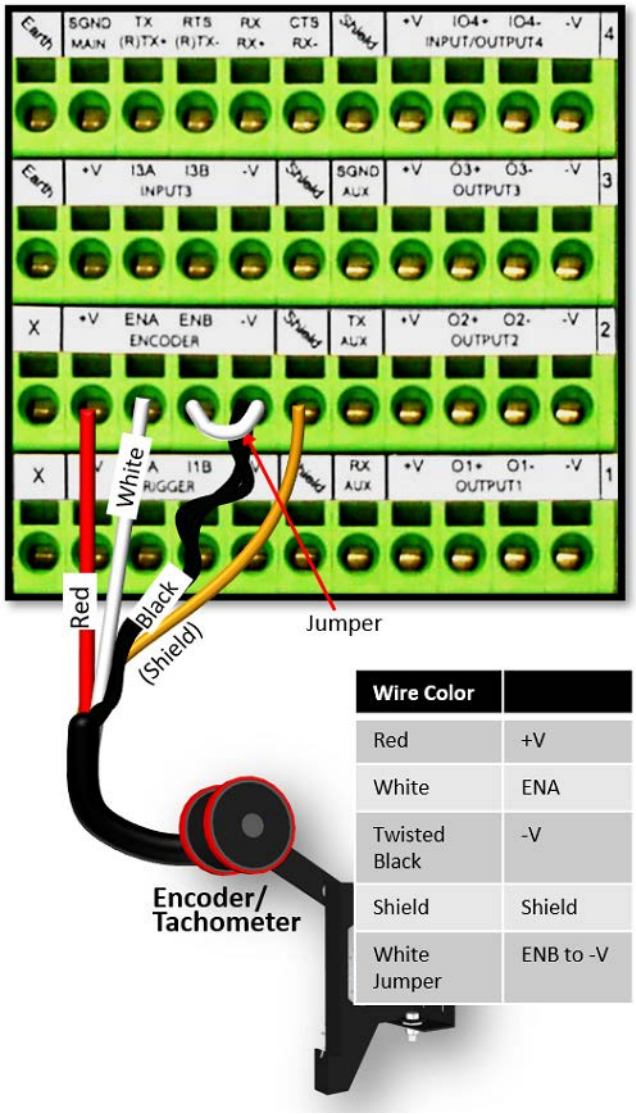
Encoder/Tachometer Wiring for NPN Output to CBX510



Wire Color	
Red	+V
White	ENA
Twisted Black	-V
Shield	Shield
Jumper	ENA to +V

NOTE: Some Photocraft tachometers may have a different color coding:
(+V) Red or White/Orange
(Signal) White or White/Blue
(Ground) Black or **Orange/White**

Encoder/Tachometer Wiring for PNP Output to CBX510

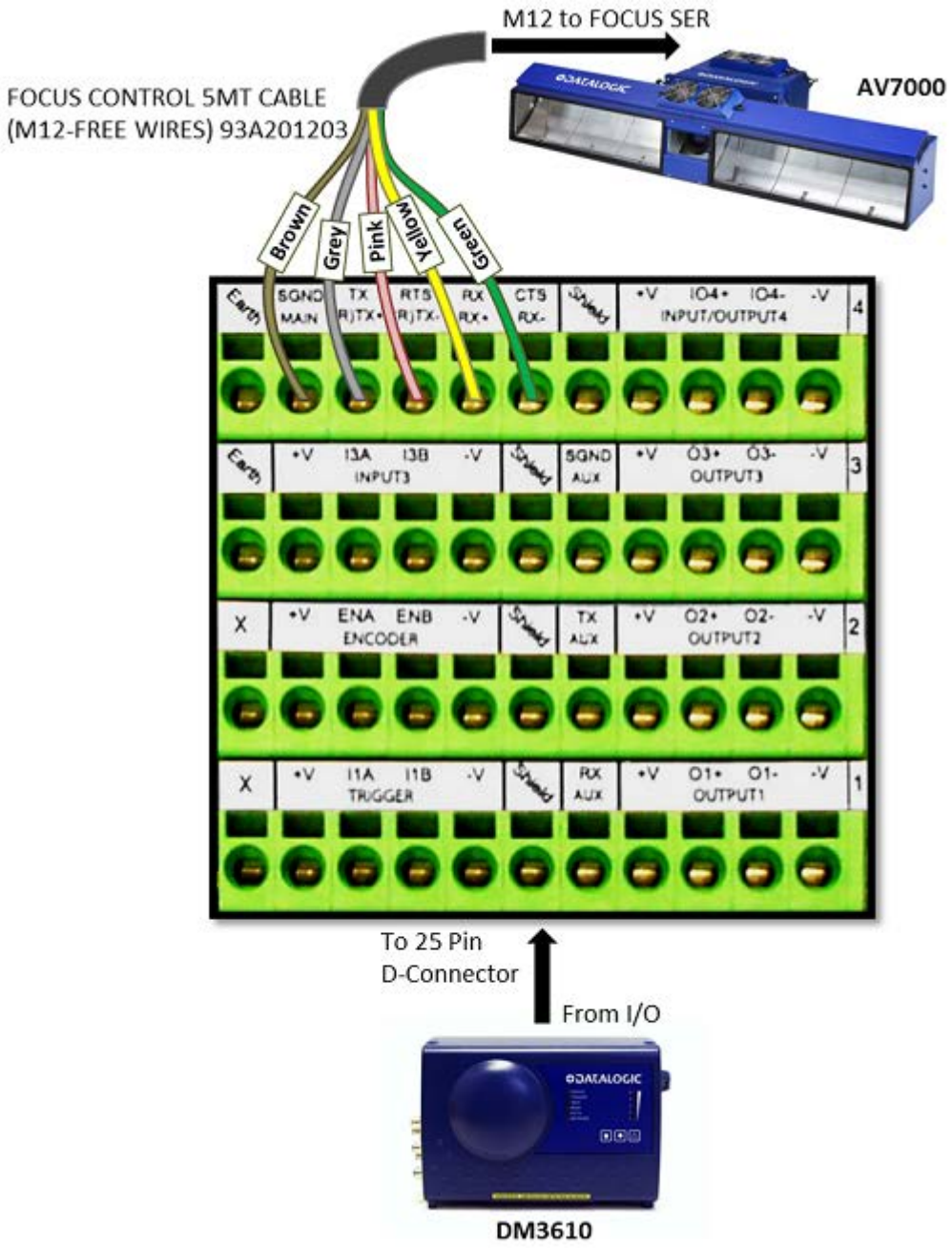


Wire Color	
Red	+V
White	ENA
Twisted Black	-V
Shield	Shield
White Jumper	ENB to -V

NOTE: Some Photocraft tachometers may have a different color coding:
(+V) Red or White/Orange
(Signal) White or White/Blue
(Ground) Black or **Orange/White**

Wiring from DM3610 CBX510 to AV7000 FOCUS SER

When using a DM3610 dimensioner for focusing, the DM3610's CBX box must be wired to the focus serial (FOCUS SER) port of the master AV7000 using a flying lead to M12 cable (FOCUS CONTROL 5MT CABLE (M12-FREE WIRES) 93A201203.)

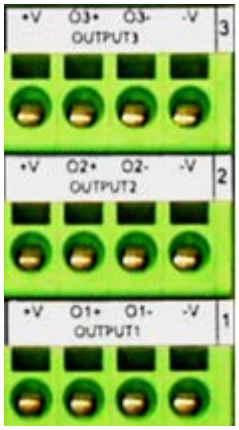


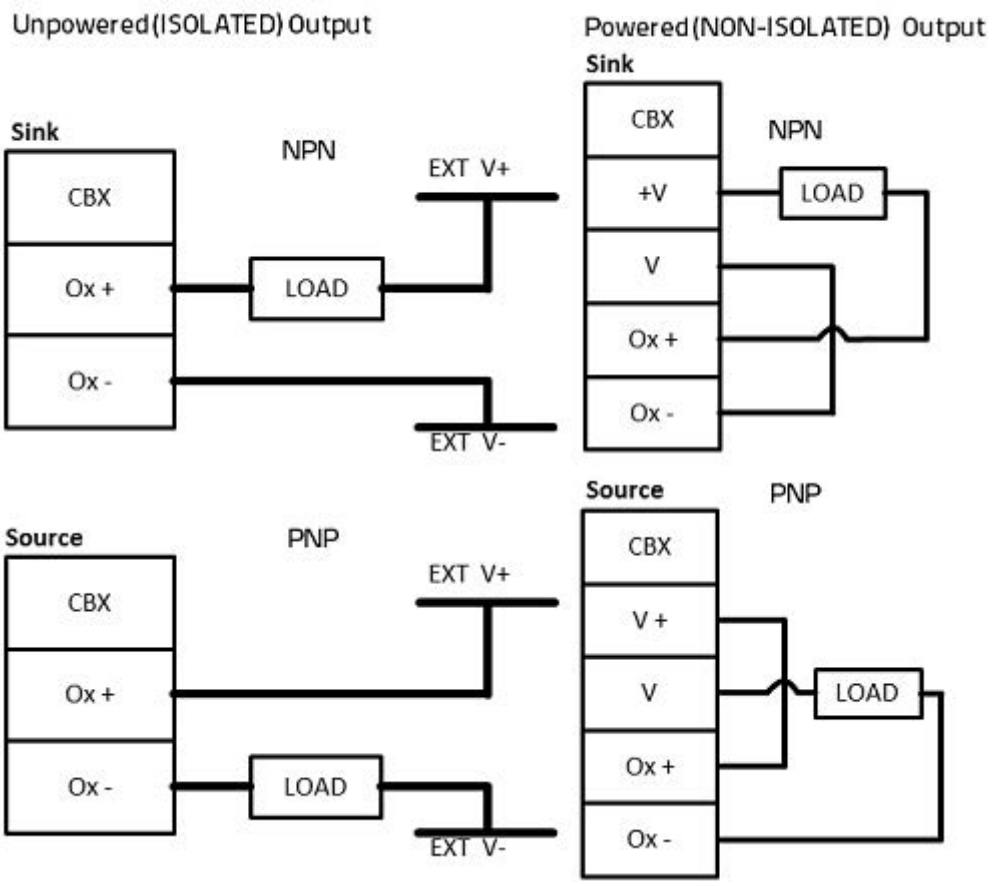
Digital Output Configuration from CBX510

The CBX510 includes an OUTPUTS block for wiring relays as needed for external accessories.

Schematics for Isolated and Non-Isolated digital outputs are provided below.

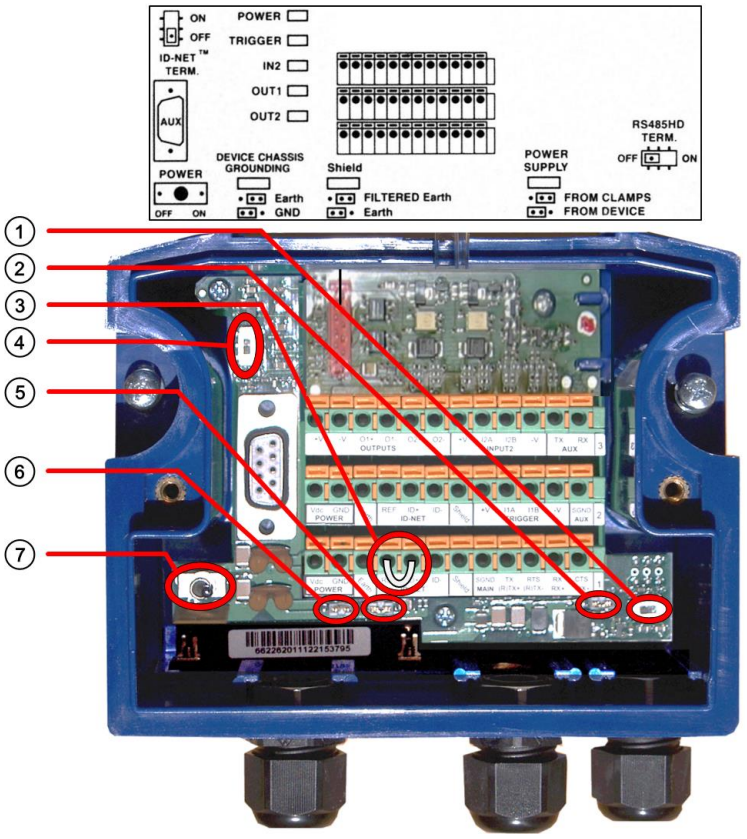
Outputs 1 - 3
Maximum Voltage 30 Vdc
Collector Current (pulse) 130 mA Max.
Collector Current (continuous) 40 mA Max.
Saturation Voltage (VCE) 1 V at 10 mA Max.
Maximum Power Dissipation 90 mW at 50°C (Ambient temperature)





CBX100

Please verify that the CBX100 connection box is configured for the AV7000 application as follows:



Reference the image and diagram above:

1. Set RS422HD TERM switch to OFF.
2. Set POWER SUPPLY jumper to FROM DEVICE.
3. Insert jumper wire in pin block from REF to ID+ (one jumper in either block is sufficient).

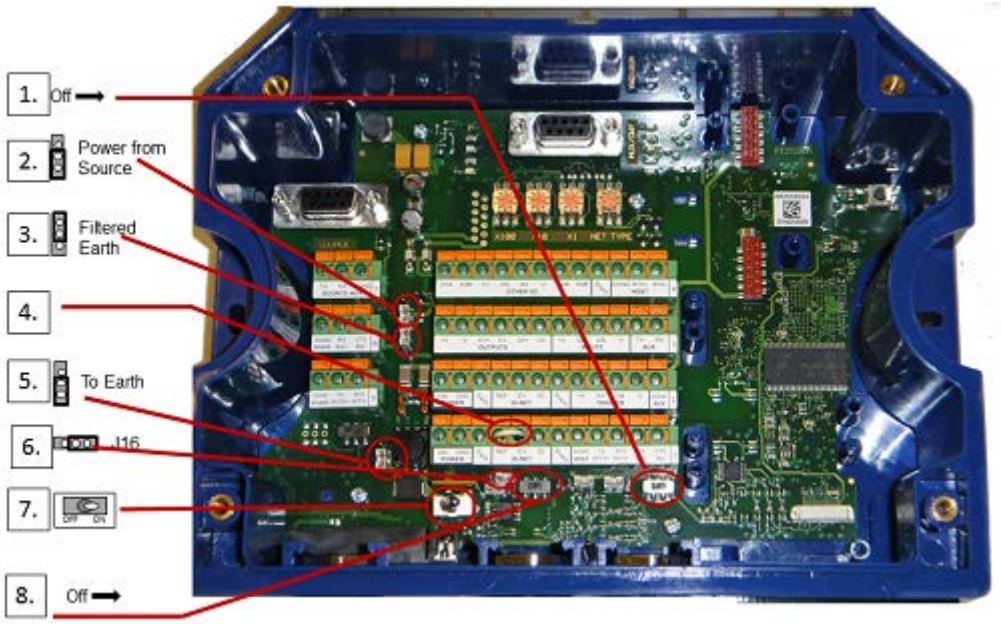
NOTE: In order for a standalone or Master AV7000 to initialize properly, it must be connected to a CBX100. On power-up the AV7000 looks for the jumper (item number 3 in the image above) and will assume the responsibility of provided the SYNC Network IP addresses. Slave units in an array/tunnel will receive their SYNC Network IP addresses from the Master.

WARNING: Although multiple AV7000 cameras can have a CBX box, only one of the CBX boxes in a multi-camera system can have the jumper to make it the Master.

4. Set ID-NET TERM switch to OFF.
5. Set Shield jumper to FILTERED Earth.
6. Set DEVICE CHASSIS GROUNDING to Earth.
7. Set POWER Switch to ON.

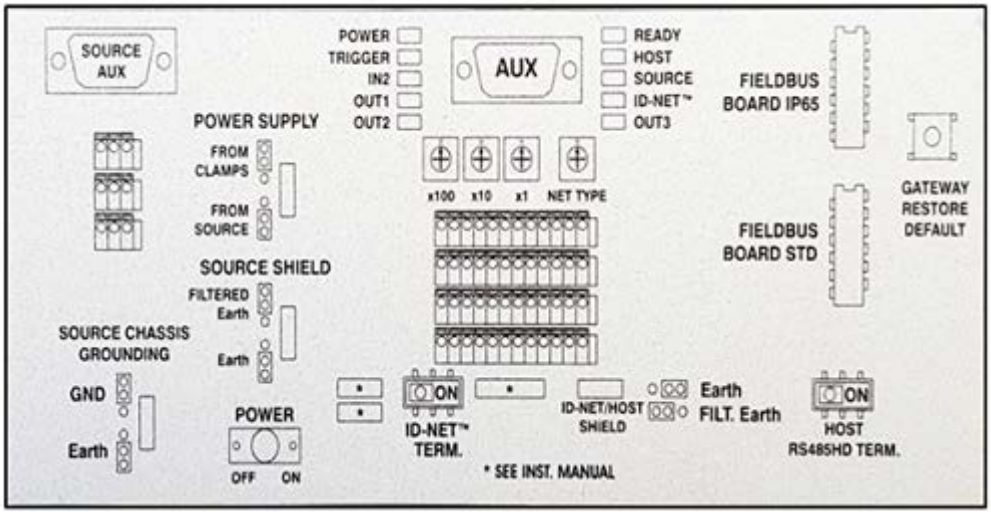
CBX800

Please verify that the CBX800 connection box is configured for the AV7000 application as follows.



1. Set HOST RS485HD TERM switch to OFF.
2. Set Power Source Selector jumper to FROM SOURCE.
3. Set Shield jumper to FILTERED Earth.
4. Insert jumper wire in pin block from REF to ID+ (one jumper in either block is sufficient).
5. Set DEVICE CHASSIS GROUNDING to Earth.
6. Set J16 Jumper 16 to right position.
7. Set POWER switch to ON.
8. Set ID-NET TERM switch to OFF.

Box Interior Diagram



Photoelectric Sensor Connections to CBX100/800

Barcode scanning applications may use a Datalogic photoelectric sensor as a trigger device. The photoelectric sensor is wired directly into the CBX510 terminal block.

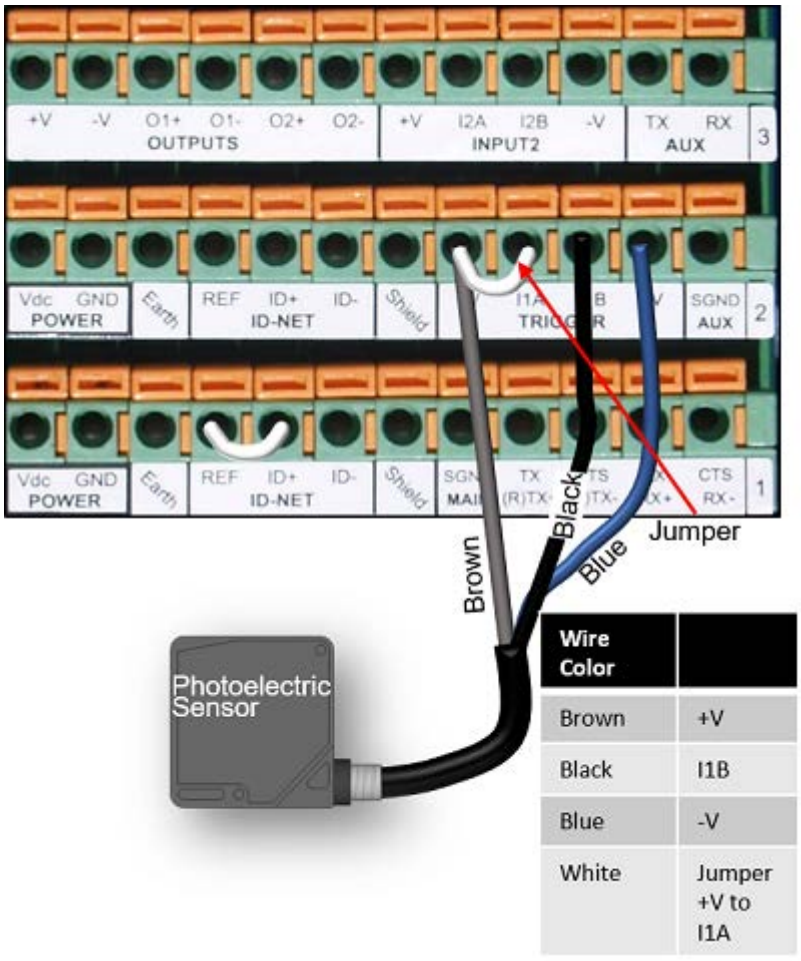
If your application uses a trigger other than the one specified by Datalogic, follow the appropriate wiring diagram to assure proper wiring.

WARNING: You must use shielded interface cables with this product. To maintain FCC compliance, the cable shield must make a 360-degree connection to the shielded mating connector.

NOTE: To confirm the photoelectric sensor is functioning properly, watch the TRIGGER LED first in the CBX and also on the camera while the photoelectric sensor's beam is blocked. The Datalogic photoelectric sensor also includes a status LED.

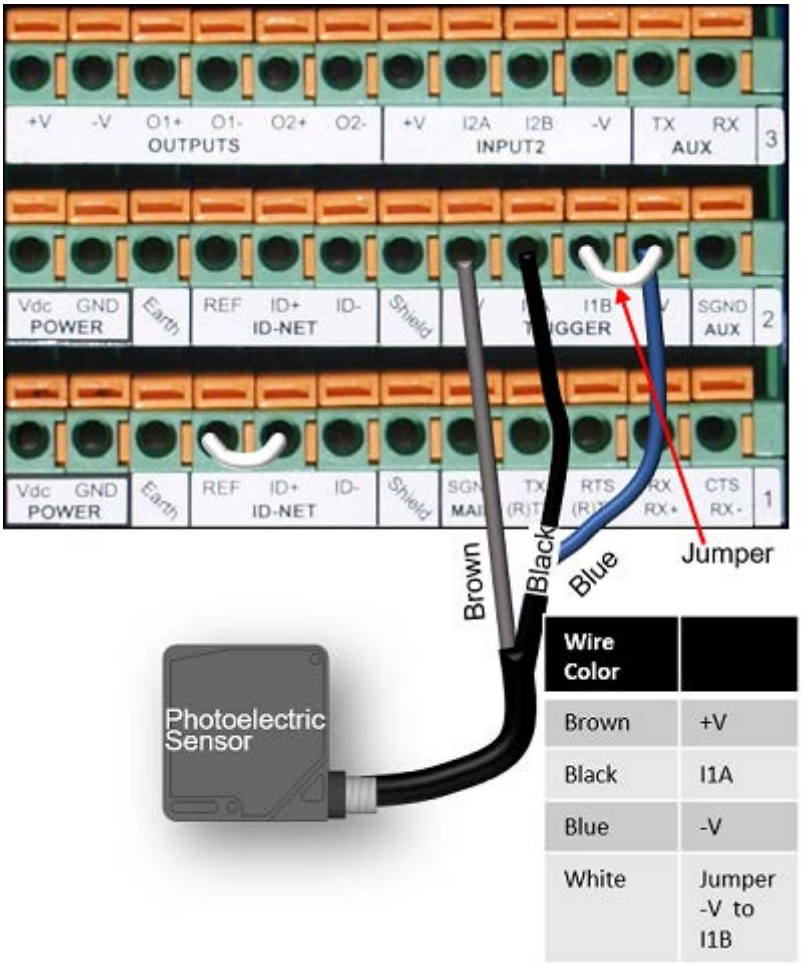
The following diagrams illustrate standard recommended wiring of the Photoelectric Sensor to the CBX510 terminal block.

Photoelectric Sensor to CBX100 and CBX800 (NPN)



Wire Color	
Brown	+V
Black	I1B
Blue	-V
White	Jumper +V to I1A

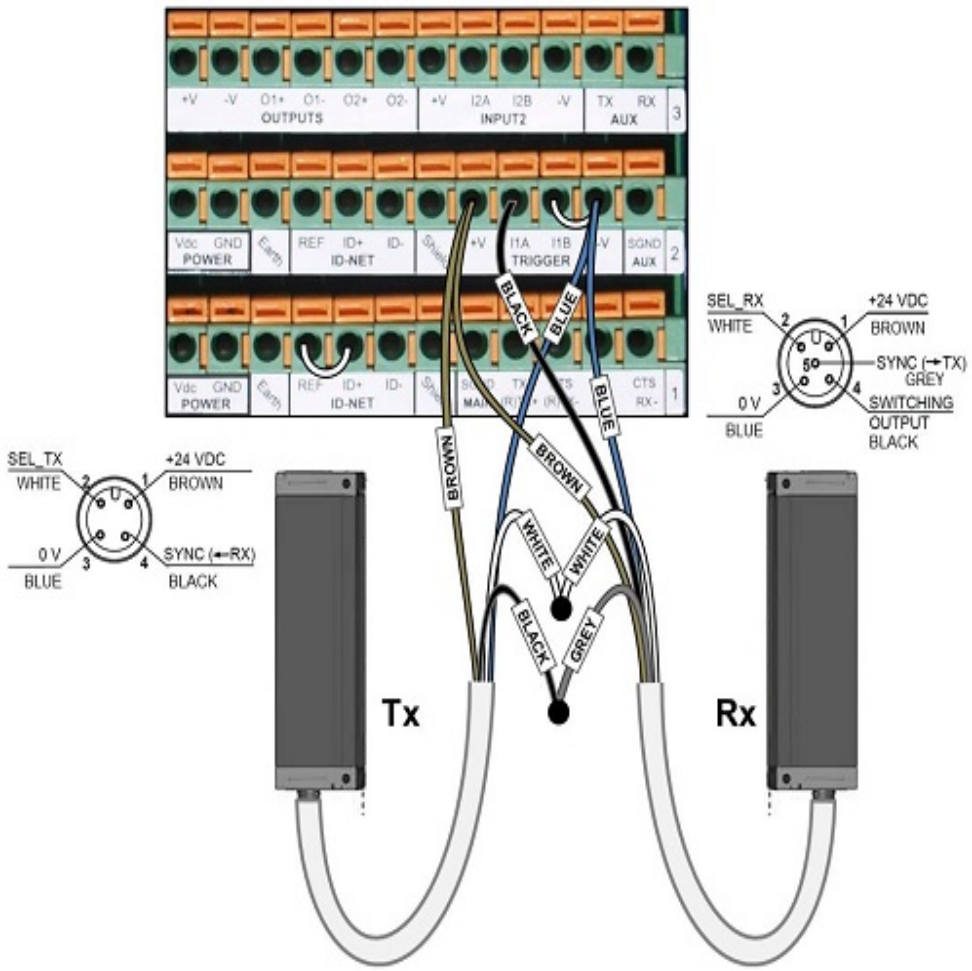
Photoelectric Sensor to CBX100/CBX800 (PNP)



Wire Color	
Brown	+V
Black	I1A
Blue	-V
White	Jumper -V to I1B

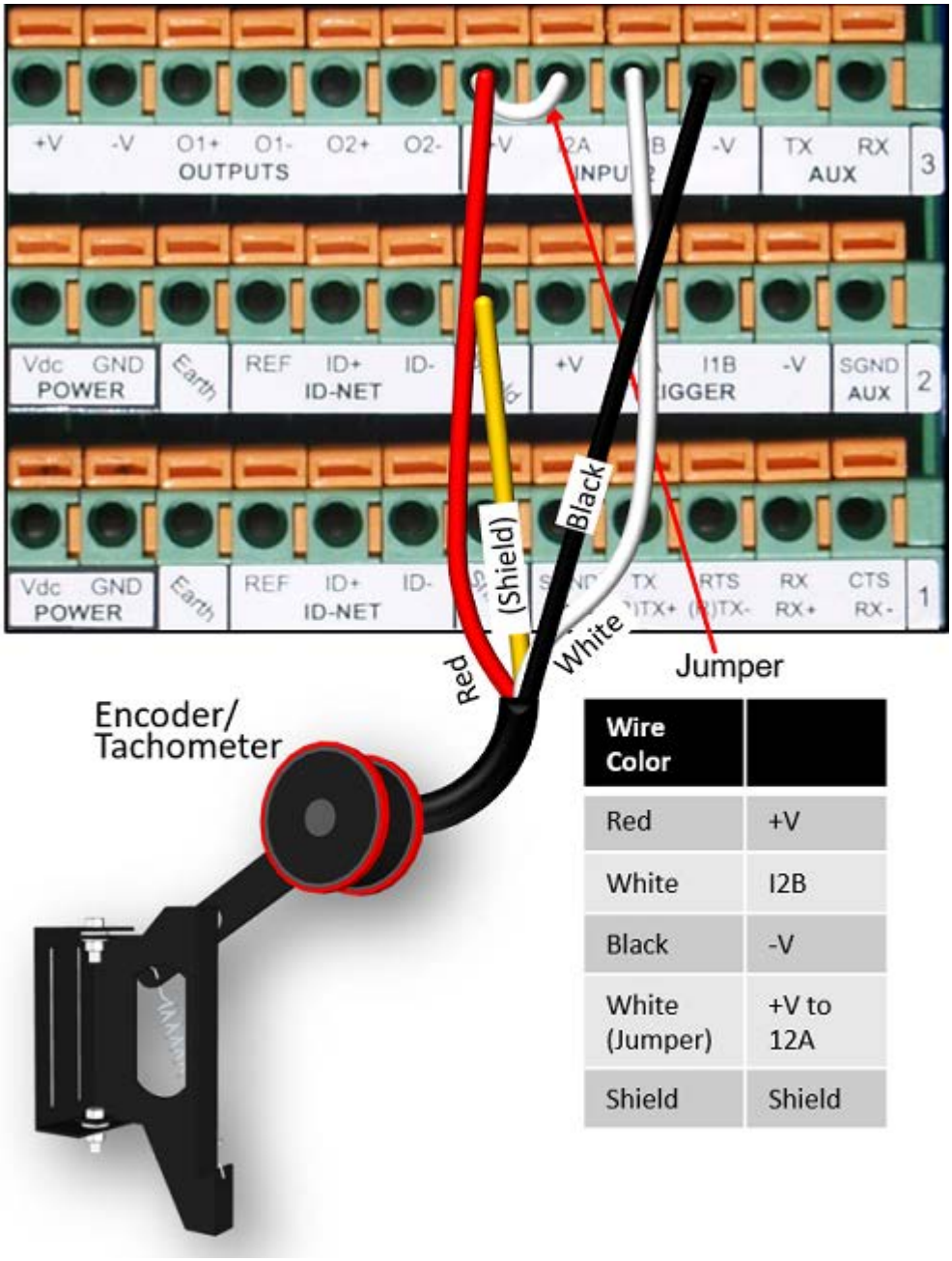
AS1 Area Sensor to CBX100/CBX800 Connections

The **AS1** area sensors can detect and provide trigger for very small or irregularly shaped objects. PNP Output



Encoder/Tachometer Wiring to CBX100/CBX800

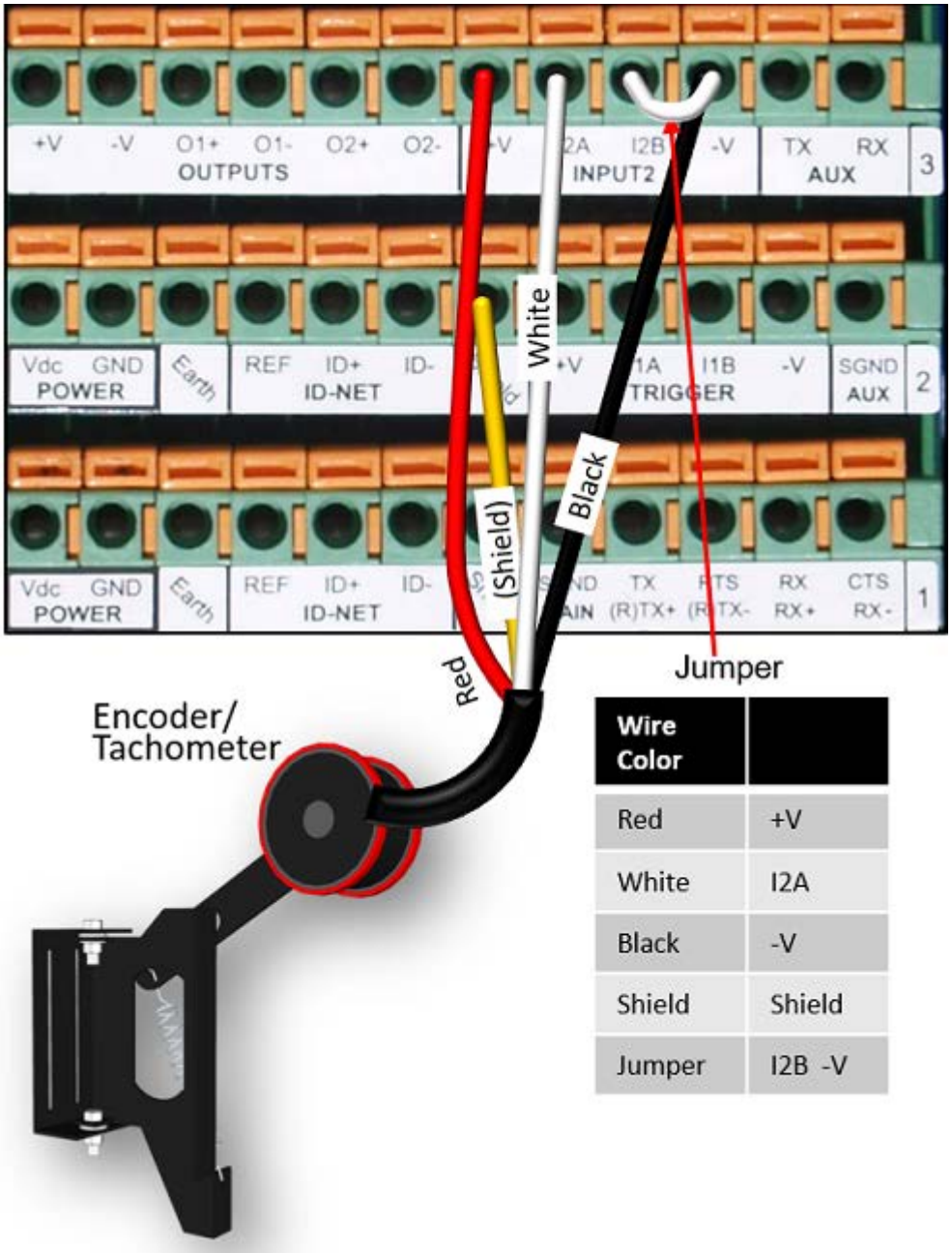
Encoder/Tachometer Wiring for NPN Output to CBX100/CBX800



Wire Color	
Red	+V
White	I2B
Black	-V
White (Jumper)	+V to 12A
Shield	Shield

NOTE: Some Photocraft tachometers may have a different color coding:
(+V) Red or White/Orange
(Signal) White or White/Blue
(Ground) Black or **Orange/White**

Encoder/Tachometer Wiring for PNP Output to CBX100/CBX800

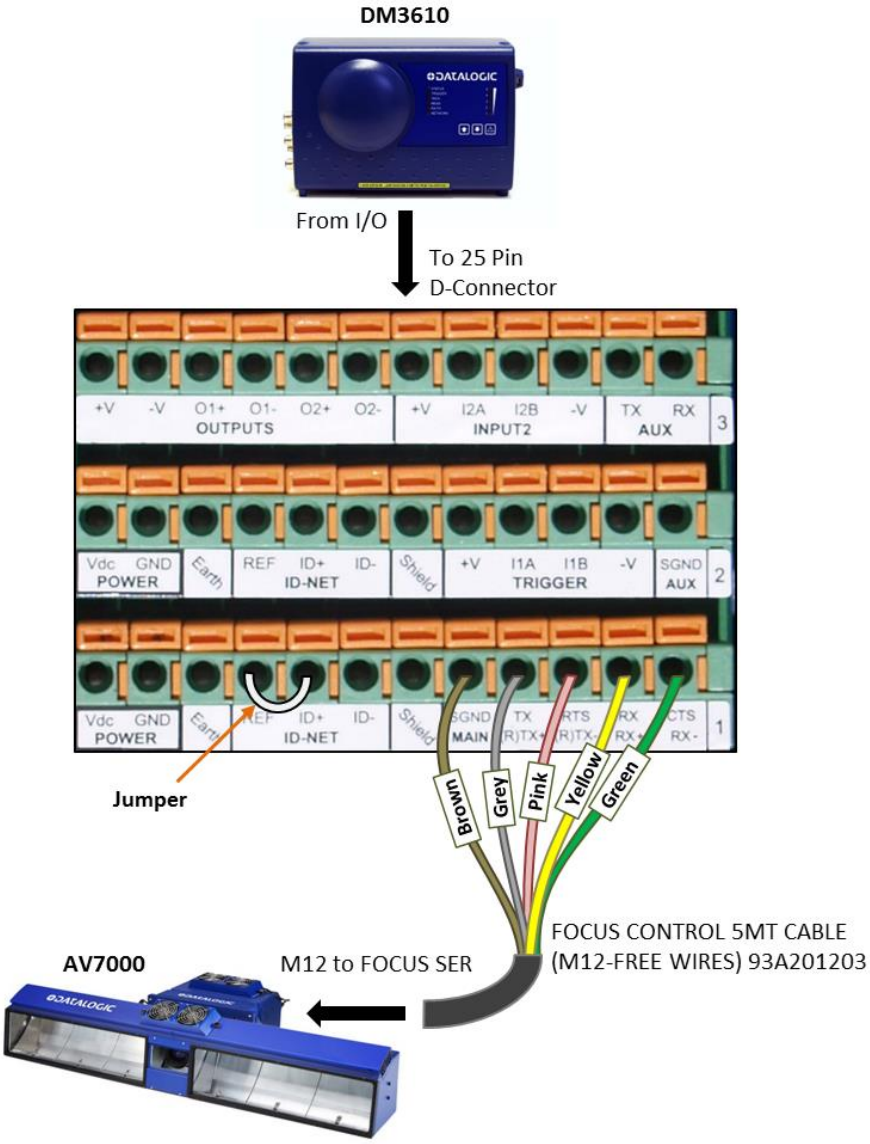


Wire Color	
Red	+V
White	I2A
Black	-V
Shield	Shield
Jumper	I2B -V

NOTE: Some Photocraft tachometers may have a different color coding:
(+V) Red or White/Orange
(Signal) White or White/Blue
(Ground) Black or **Orange/White**

Wiring from DM3610 CBX100/CBX800 to AV7000 Focus Serial

When using a DM3610 dimensioner for focusing, the DM3610's CBX box must be wired to the focus serial (FOCUS SER) port of the master AV7000 using a flying lead to M12 cable (FOCUS CONTROL 5MT CABLE (M12-FREE WIRES) 93A201203.)



Serial Communication Wiring to CBX100/CBX800

The AV7000 provides serial RS232/RS422 communications to other devices through the CBX100/CBX800.

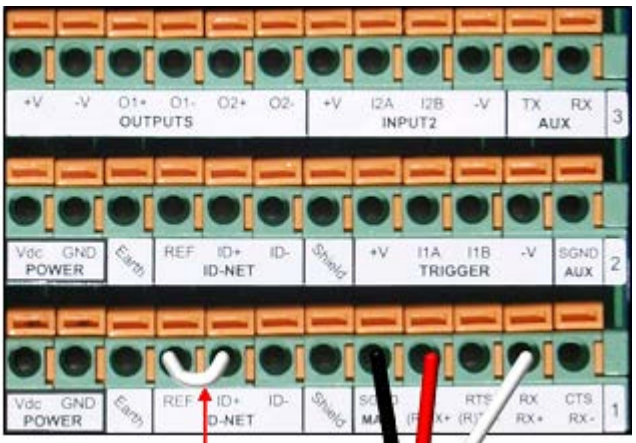
- RS232 provides point-to-point communications at distances up to 15 M [50 ft].
- RS422 provides point-to-point communications at distances up to 1200 M [3940 ft]

The following wiring diagrams illustrate the different types of serial communications available via the CBX100 pin block. It is very important that you make the proper pin connections.

RS232 with No Handshaking

Use RS232 for a direct connection to a controller, personal computer, or other device. RS232 provides point-to-point communications at distances up to 15 M [50 ft]. If longer cable lengths are needed, use RS422.

Use the following illustration as a guide when you want to connect your system to a device using RS232 communication with no handshaking.

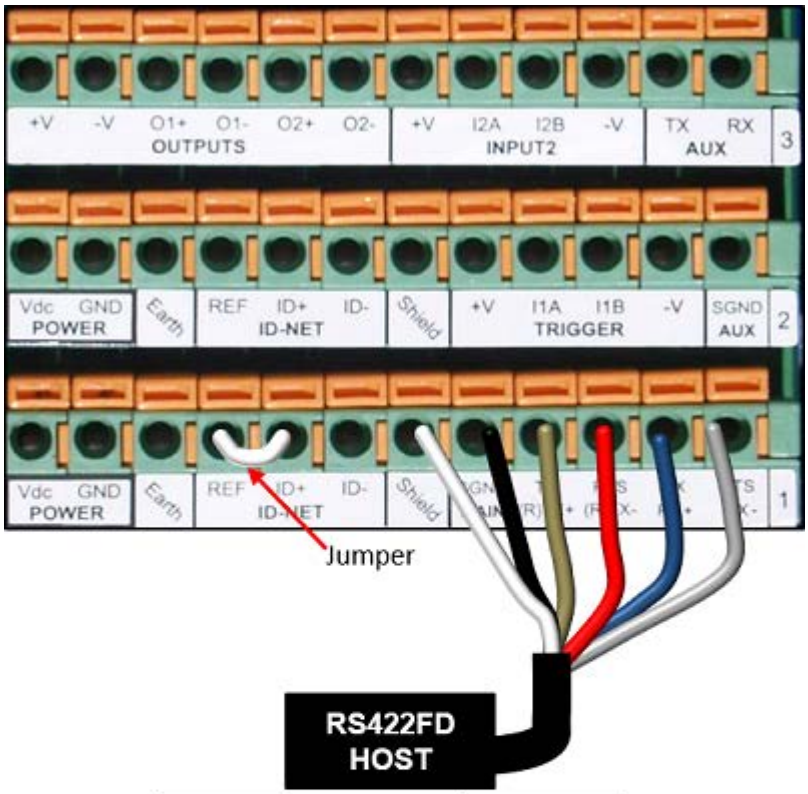


Wire Color	Host Signal	CBX Aux Terminal
White	Host TX	RX
Red	Host RX	TX
Black	Signal GND	SGND
Jumper	NA	REF to ID+

RS232 HOST

RS422FD HOST (Full Duplex)

Use RS422 for a direct connection to a controller, personal computer, or other device. RS422 provides point-to-point communications at distances up to 1200 M [3940 ft]. Full duplex wiring supports a four wire, double twisted pair RxD/TxD. The Signal GND and shield cables are also required as shown.

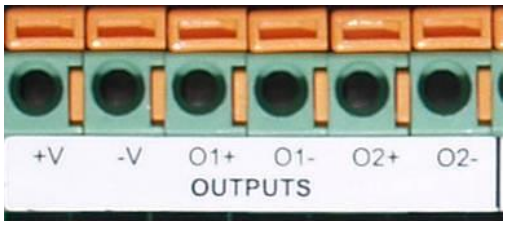


Wire Color	Host Signal	CBX Main Terminal
White	Cable Shield	Shield
Black	Signal GND	SGND
Brown	Host RX+	TX+
Red	Host RX-	TX-
Blue	Host TX+	RX+
Gray	Host TX-	RX-
Jumper	NA	REF to ID+

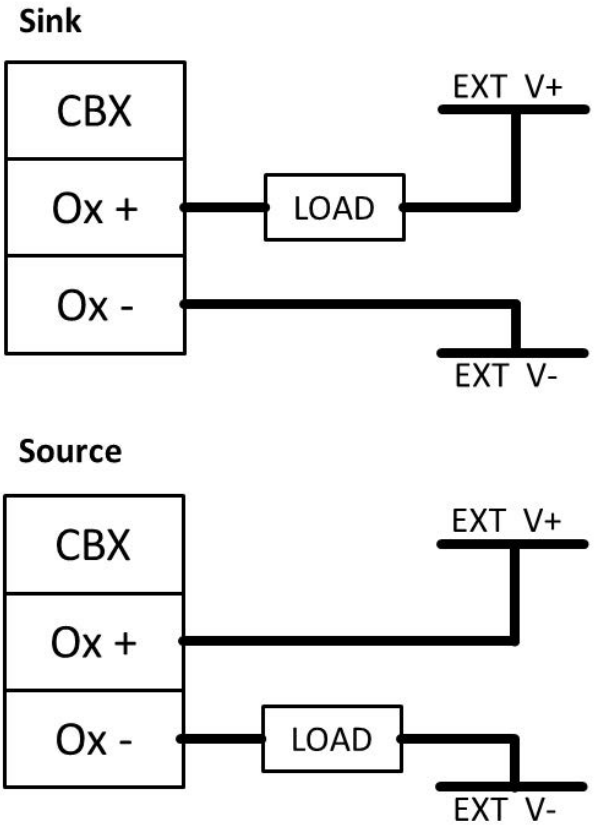
Relay Configuration for CBX100/800

The CBX100/CBX500 includes an OUTPUTS block for wiring relays as needed for external accessories. e-Genius Modify | Relays window includes options for outputs 1 and 2 including Life Light, Trigger Output, Error Light, Ready Light, Good Dim, and No Dim.

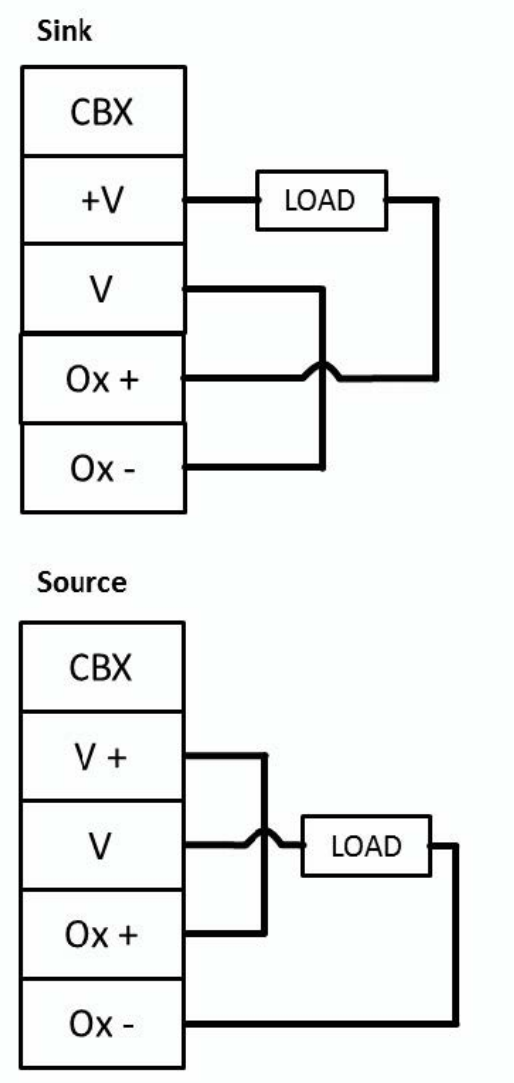
Schematics for Isolated and Non-Isolated relays are provided below.

Outputs 1 and 2	
Maximum Voltage 30V	
Collector Current (pulse) 130 mA Max.	
Collector Current (continuous) 40 mA Max.	
Saturation Voltage (VCE) 1 V at 10 mA Max.	
Max Power Dissipation 90 mW at 50 degrees C (Ambient temperature)	

Unpowered Outputs



Powered Outputs



Grounding

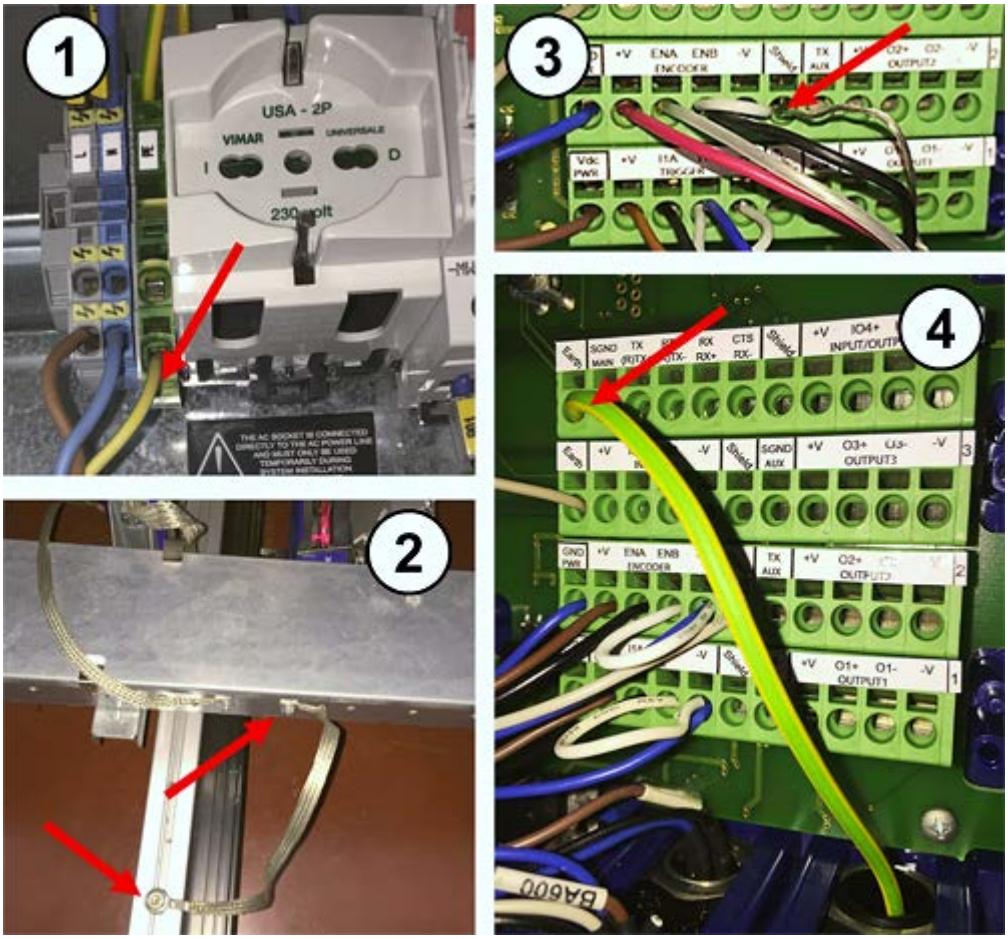
To avoid any problems with electrical noise that could negatively affect system function, make sure that:

1. The AC power cable coming into the PWR box is always provided with a Ground and connected to the proper connector (Protective Earth - PE).

2. The structure where the readers, controllers, encoders/tachometers, and photoelectric sensors are mounted is grounded to the conveyor or to the PE terminal inside the PWR.

3. The Shield wires from the Encoder/Tachometer and photoelectric sensor cables are connected to the proper *Shield* terminal in the CBX box.

4. Normally, steps 1 through 3 will guarantee proper function. In case of problems such as transmission of strange or wrong characters, devices stop working without any reason, or other unexpected behavior, try connecting the CBX or Controller Earth terminal to the PE terminal inside the PWR box.



INSTALLING THE OPTIONAL VGA / USB INTERFACE PANEL KIT

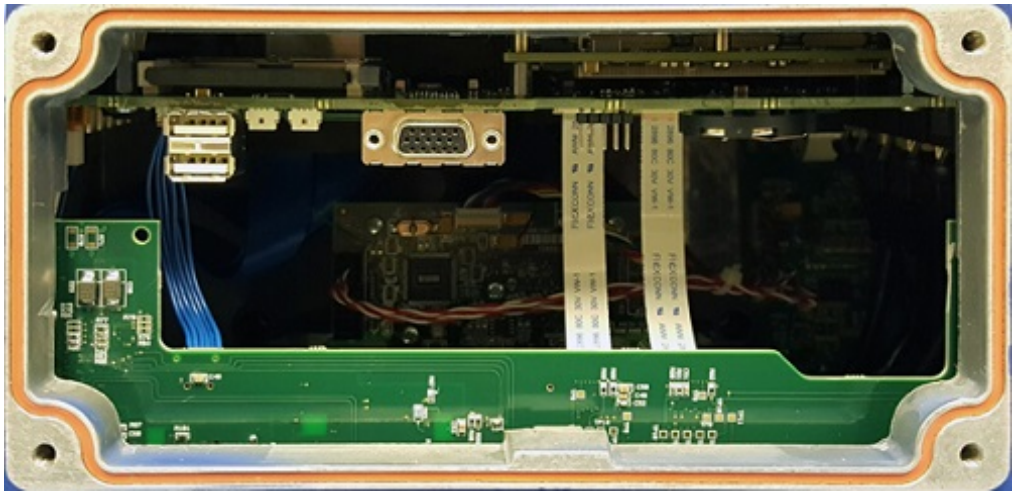
An optional **VGA / USB Interface Panel Kit** (93A201204) replacement panel accessory can be used to attach a monitor, keyboard and mouse to an installed AV7000 camera. In this way, system status and statistics can be monitored local to a scan point or tunnel, and the monitor, keyboard and mouse can be used to change parameters without the need of an external computer.

ESD CAUTION: Observe precautions to prevent Electrostatic Discharge (ESD). Use an ESD grounding wrist strap and avoid direct contact with circuit boards, which could be damaged by ESD.

To install the optional VGA / USB Interface Panel Kit:

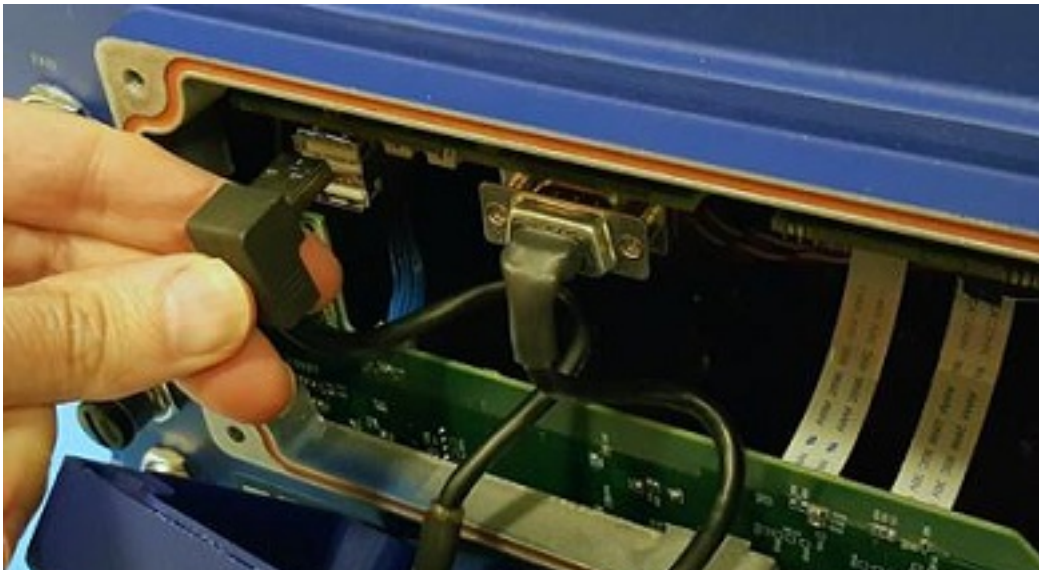
1. Disconnect the power source from the AV7000 camera.
2. Remove the camera's rear access panel by loosening the four screws at its corners.

3. Locate the USB and VGA connectors inside the camera.

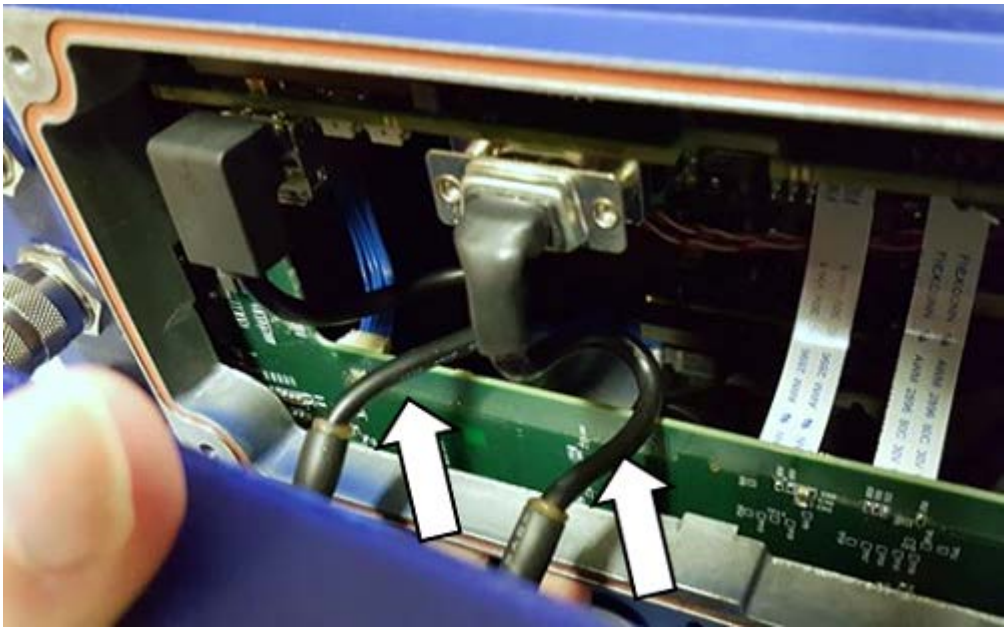


4. Connect the VGA cable on the back of the VGA / USB Interface Panel Kit to the VGA connector inside the back of the camera.

5. Connect the USB cable on the back of the VGA / USB Interface Panel Kit to one of the USB connectors inside the back of the camera.



6. Carefully push the USB and VGA cables into the camera housing above the circuit board as shown below.

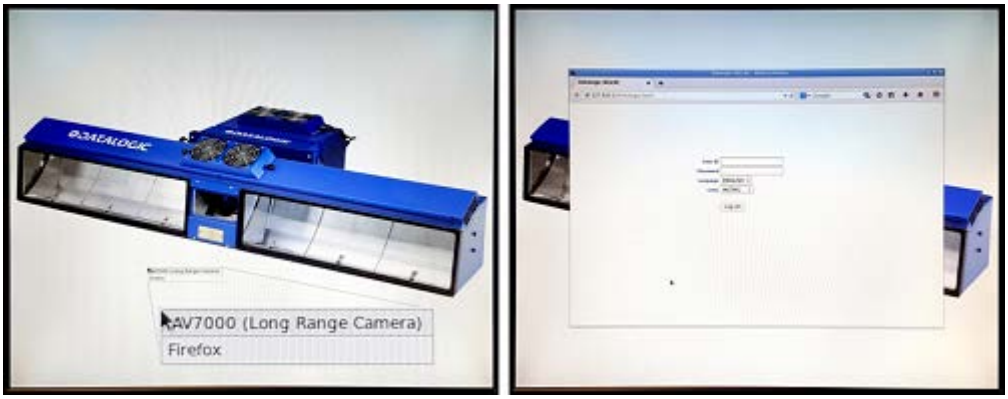


7. Carefully position the VGA / USB Interface Panel Kit cover and tighten the four screws at its corners.

8. Attach the monitor to the VGA port and the combination keyboard/mouse to the USB port (MONITOR/KEYBRD/BRKT/USB HUB KIT, 93ACC0126).

9. Reapply power to the AV7000 Camera.

NOTE: When the camera is powered on, the monitor comes on after several seconds and displays an image of the AV7000 camera system. To access a browser (Firefox), right click with the mouse on the monitor window. A drop-down list appears. Select **Firefox** to open the browser to the e-Genius **Log On** window.



Check AV7000 Installation

After completing the installation, confirm that the AV7000 reader(s) and CBX connection box have been properly installed mechanically and electrically. Use the Installation Sequence at the beginning of this chapter and your application specifications to check your installation.

CHAPTER 4
SETUP AND CALIBRATION

The AV7000 Camera can be set up as a single unit or with multiple AV7000s in a scanning array (tunnel). The AV7000 camera system is a high-precision imaging system, and requires careful and accurate setup and calibration to function at its full potential.

Review Mounting Drawing and Application Specifications

Make sure all equipment is mounted correctly based on the application drawings and specifications.

- **AV7000 Deflection Mirror Alignment** - Reference the application drawing and for deflection mirror placement and mounting.
- **Photoelectric Sensor, Trigger (if applicable)** - Mount the photoelectric sensor according to the application drawing, and with the following recommendations:
  - Make sure the PS is square to the conveyor
  - Make sure the PS is high enough off the conveyor surface that it will not get false triggers from any part of the conveyor
  - Make sure the PS is aligned properly to the reflector. (In a sender receiver application, make sure the two components are aligned correctly)
  - Make sure the PS is 155 mm [6 in] or greater upstream from the RangeFinder scan line (if applicable).
- Refer to the Focusing Device Setup in the Product Reference Guide and each focusing device setup guide for complete details.

AV7000 SOFTWARE UPDATE

If necessary, a Datalogic technician will update the AV7000 CPU with the latest software. This must only be done by, or under the guidance of, a trained Datalogic technician.

DO NOT use a parameter file from any previous AV7000 installations.

Connect a Laptop to the AV7000.

The static and dynamic calibration can be accomplished using any of the three Ethernet ports; Image, Host or Sync:

- Host default IP: 192.168.3.10
- Image default IP: 10.0.40.20
- Sync Controller IP (the sync adapter cable must be used): 192.168.0.145

NOTE: Your PC's IP address needs to match the camera system's IP Address range, See Online help for details. The Host and Image port IP addresses may have been changed for your application. Contact your system administrator for changes.

Open a browser and enter cameras IP address into the browser's address field. When **e-Genius** opens, enter the case sensitive user name (setup) and password (DLAset).

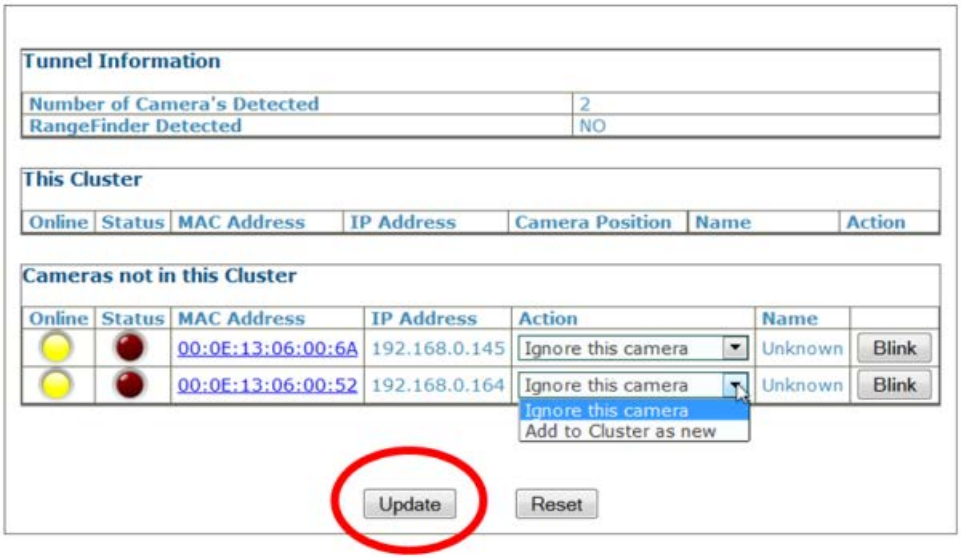
E-GENIUS CALIBRATION PRESETS

Before physical calibration is begun, a few settings need to be confirmed or modified in **e-Genius.** Your PC's IP address needs to match the camera system's IP Address range.

System Info: Bring Each Camera into the Network

When power is applied to the AV7000 scan tunnel for the first time each camera will need to be brought into the sync network using **e-Genius**.

1. From the menu tree, navigate to the **Modify Settings | System Info.** The **System Info** Page opens.

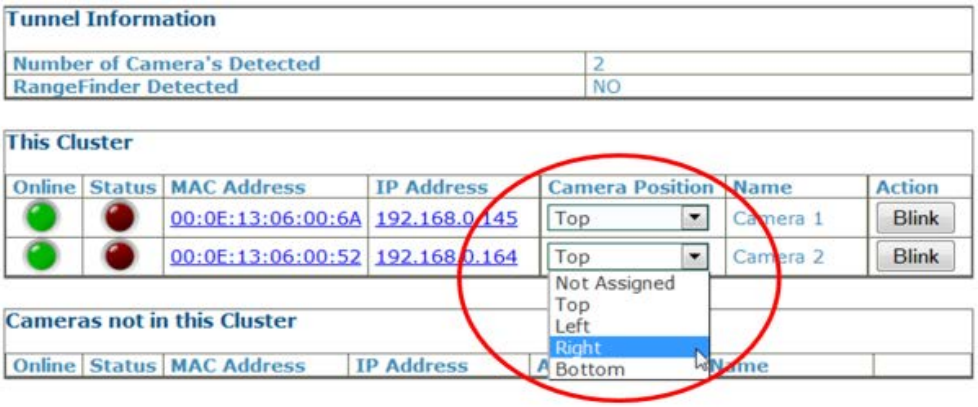


2. From the **Action** drop-down list, select the **Add to Cluster as new.**

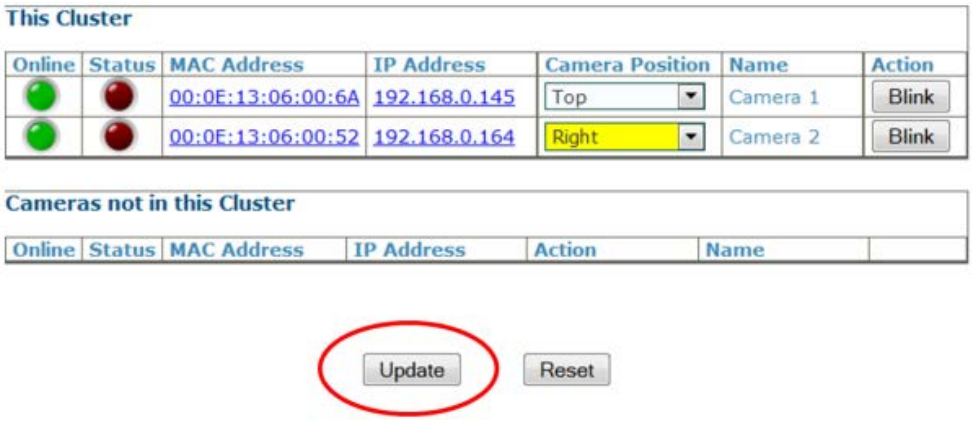
3. Click **Update** to add the camera to the **This Cluster** table.

4. Once each AV7000 has been added under **This Cluster,** its mounting positions will need to be identified. Click **Blink** in a camera's row in the table. That camera's illumination will light.

5. Once the camera has been identified, select its mounting position from the **Camera** Position drop-down list.



6. Click **Update** to save the configuration



Operating Mode

In the menu tree under **Modify Settings,** navigate to **Global Settings | Operating Mode.** The **Operating Mode** window opens.

The following parameters are important to be set to match the application:

Encoder Settings: Encoder Step Settings > Encoder Step. Conveyor speed

Conveyor width: Enter the width of the conveyor (the distance between left and right focus offsets

Trigger Source: Make sure the Trigger Active State is set correctly, To test this, navigate to **Diagnostics | Device Tracking**. Run two boxes through the system. Confirm that the start and end trigger corresponds to the correct **Seq Number.**

Transmit Point Settings

Other Important Application Dependent Parameters:

- **Modify Settings | Global Settings | Object Detection**
- **Modify Settings | Global Settings | Barcode Settings**
- **Modify Settings | Global Settings | Communications**
- **Modify Settings | Global Settings | Output Format**
- **Modify Settings | Global Settings | Image Saving**

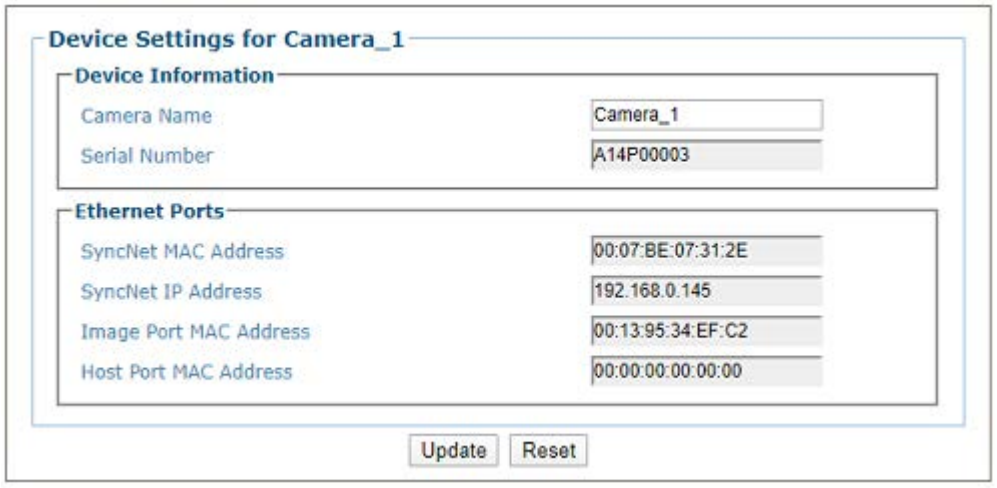
Device Settings

In the menu tree under **Modify Settings,** navigate to **Device Settings.** Due to the mounting differences among the AV7000 cameras in the system, each camera will be calibrated separately.

There will be a different **Device Settings** branch in the menu tree for each camera in the array.

1. In the menu tree, navigate to **Modify Settings | Device Settings | Camera N | Device Info.** The **Device Info** window opens.

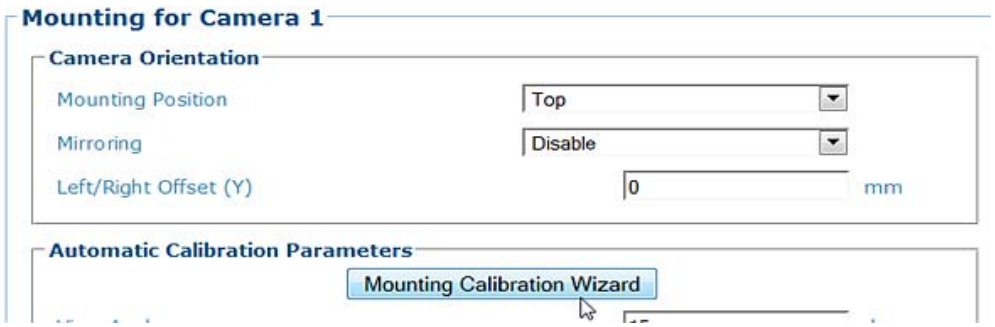
2. Enter a unique name for the camera. The new name will appear in the **Name** column on the **System Info** window, and also in the menu tree under **Device Settings.**



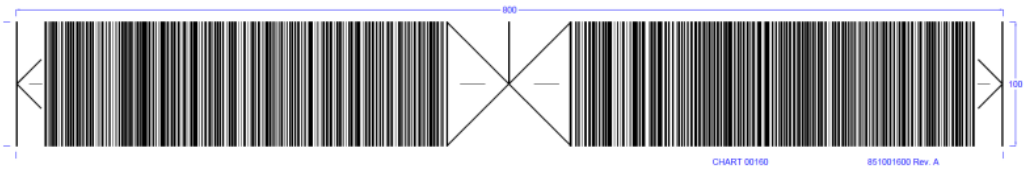
3. Click **Update** to save the new name. Repeat this for each camera in the system.

CALIBRATING AV7000: STATIC CALIBRATION

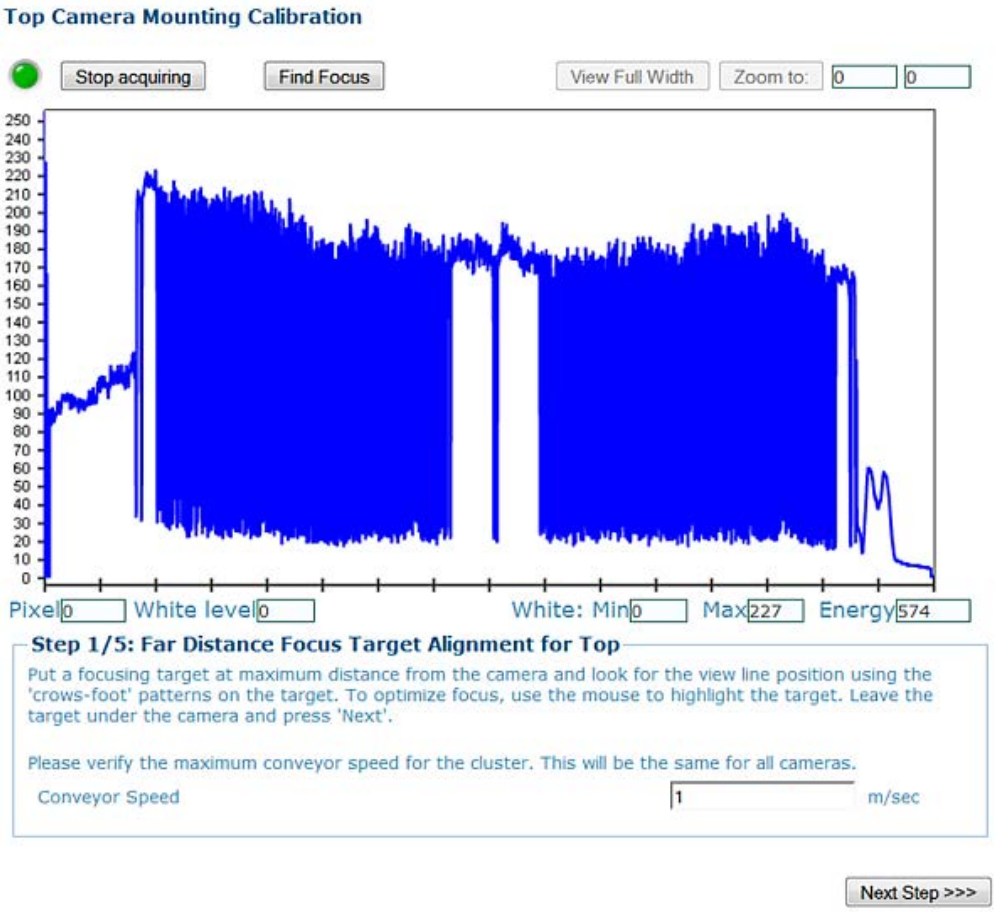
1. Navigate to **Modify Settings | Device Settings | Camera N | Mounting.** The **Mounting** window opens.



2. Place the CH-3 Autofocus Test Chart on the conveyor within the imaging area for the selected camera.



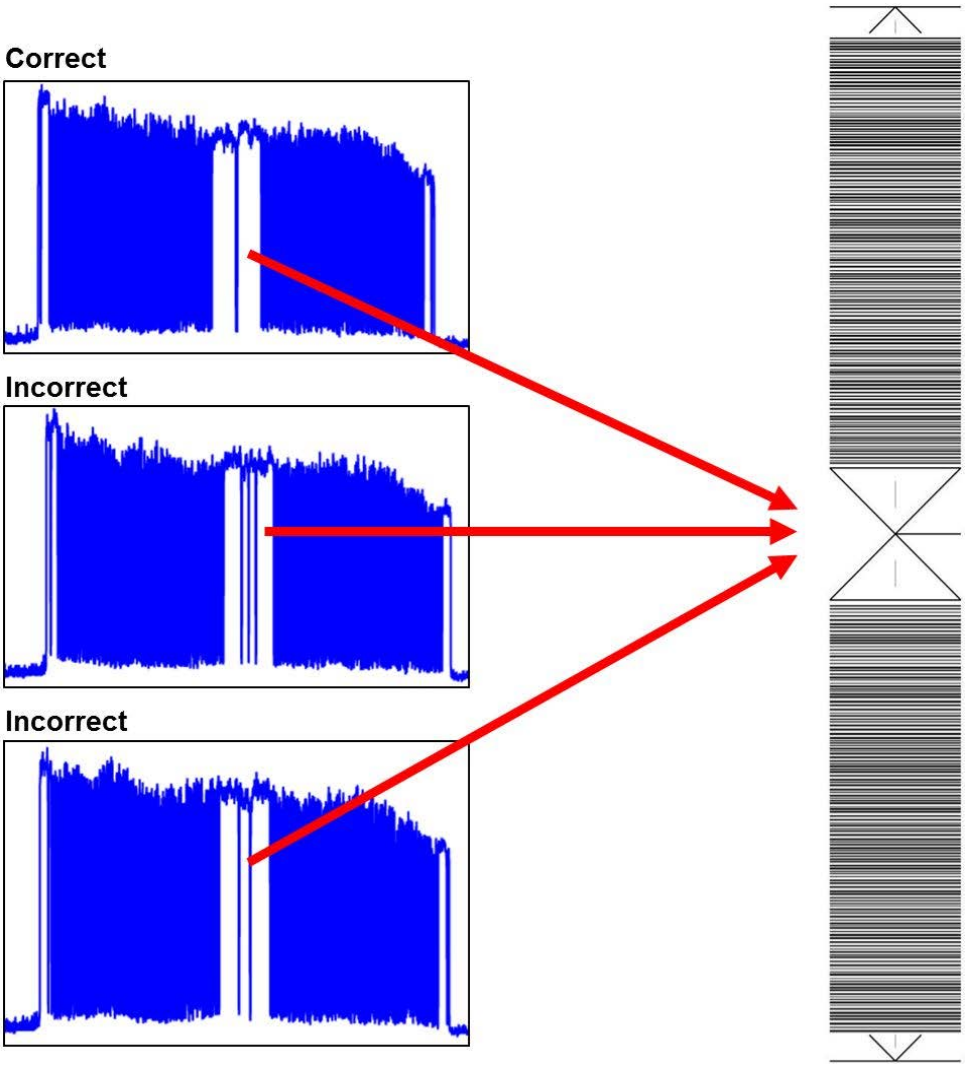
3. Click **Mounting Calibration Wizard.** The AV7000 camera launches the **Step 1/5** calibration wizard window, and attempts to focus on the calibration test target.



4. Confirm that the application's correct MAX conveyor speed (Formula: Max conveyor speed x 1.05) is in the **Conveyor Speed** field. This is used by the AV7000 to set the image exposure time.

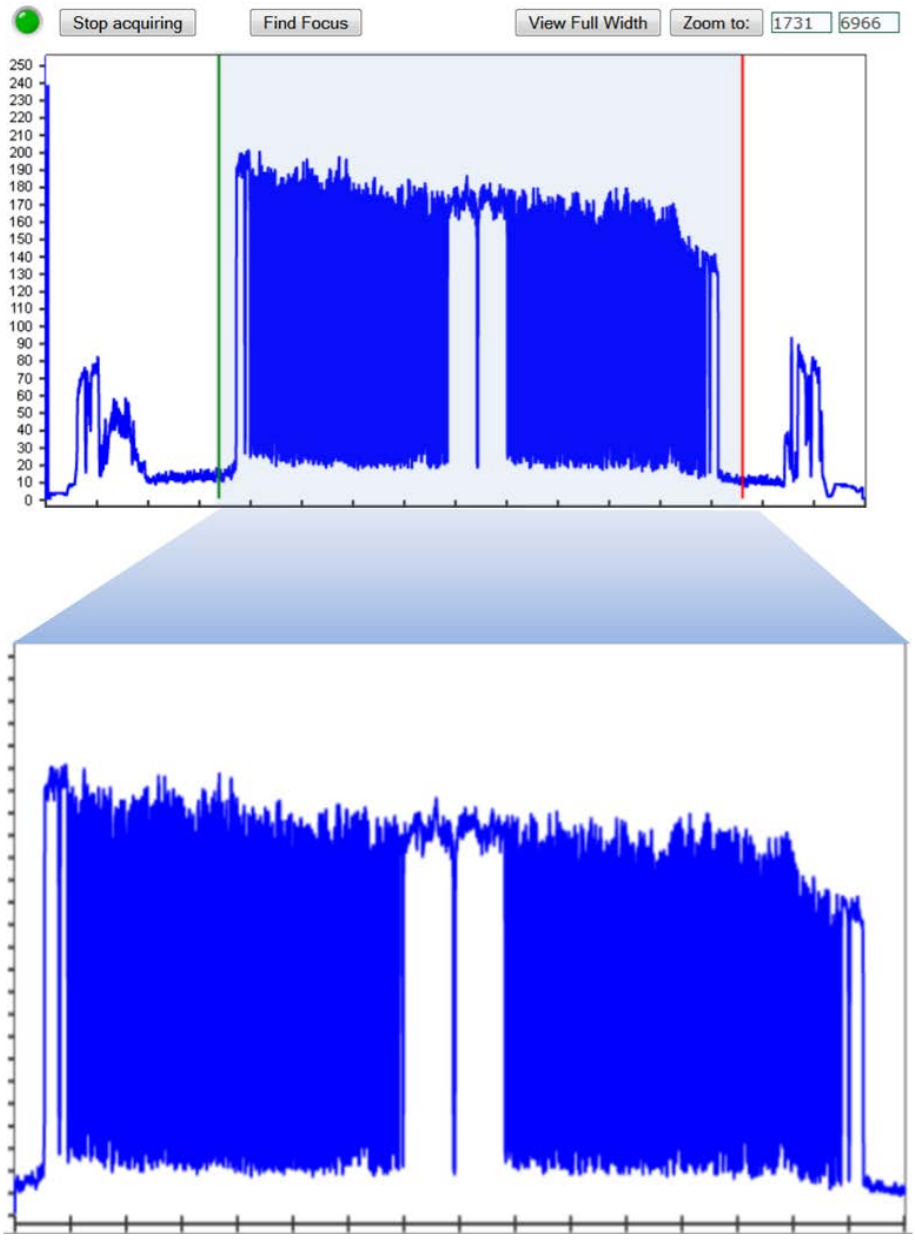
5. Place the **CH-3 Autofocus Test Chart** at the **FARTHEST** distance from the AV7000 (far working distance).

6. Adjust the target position until the center pattern is represented by only a single line.



7. Zoom into the focused area with the mouse by left clicking and holding the cursor on the left side of the image and then dragging the cursor to the right. Release the mouse button past the second focused area. This minimizes the amount of data the AV7000 has to process during this calibration step.

8. Click **Zoom to** and the image is zoomed to the selected area.



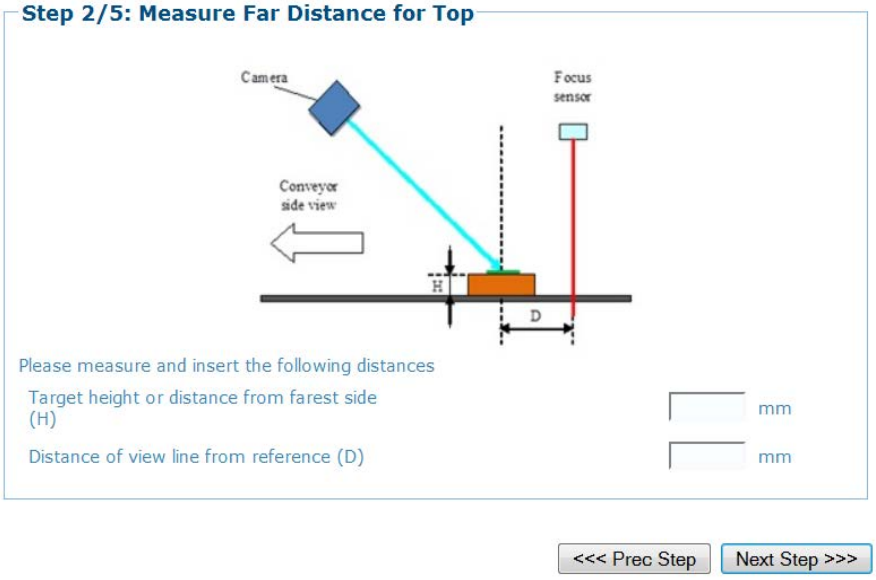
9. Click **Next Step >>>.** The **Step 2/5 Mounting Calibration Window** opens. The AV7000 uses the image and determines the optimal far working distance for the camera. This step takes a while and the “Please Wait” message will blink during this time.

Step 1/5: Far Distance Focus Target Alignment for Top

Please wait while the camera determines the optimal far working distance.
Do not move the target during this time.

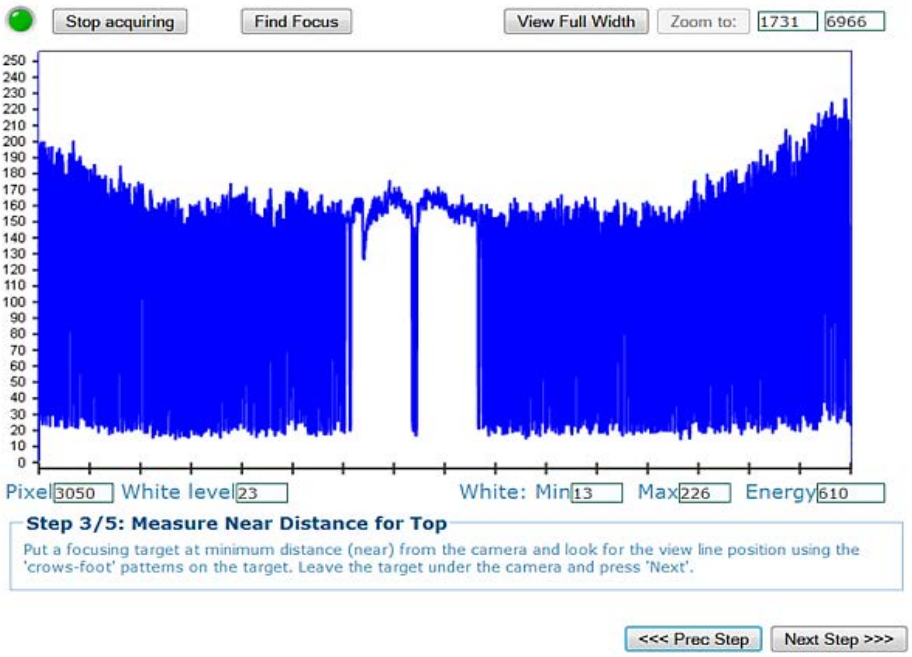
10. Enter the **Target height** (Top mount) **or distance from the farthest side** (Side Mount) **(H).**

- For **Top Read,** with the target on the conveyor this value is **0.**
- For **Side Read,** the target can be placed on a box. Set the box at the farthest distance from the AV7000 and the **H** value is the width of the box.



11. Measure the distance from the center of the **CH-3 Autofocus Test Chart** (center of X) to the focus source (DM3610, RangeFinder, or Light Curtain). Enter the distance in the **Distance of view line from reference (D).**

12. Click **Next Step >>>.** The **Step 3/5 Mounting Calibration Window** opens.

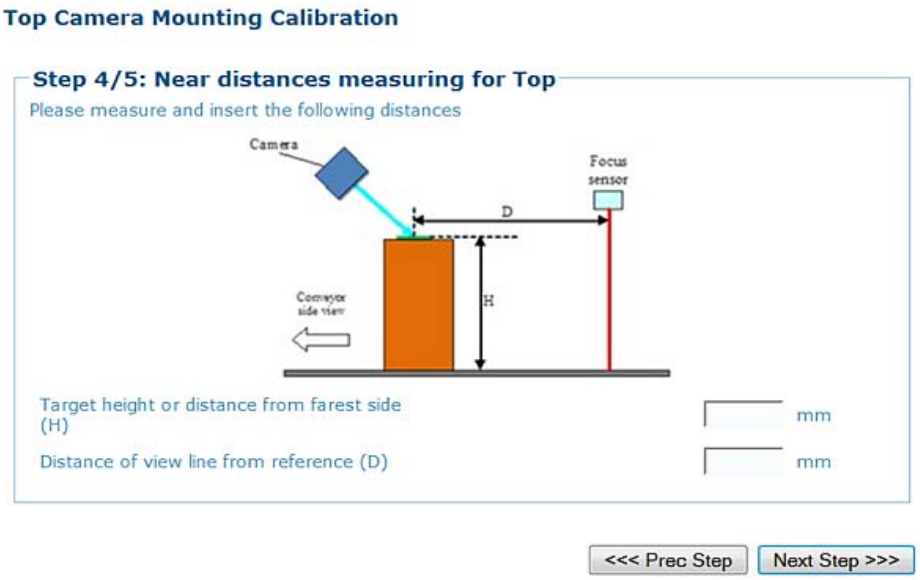


NOTE: If the image does not come into focus as shown above, click Find Focus. This should find and focus on the target.

13. Place the **CH-3 Autofocus Test Chart** at the near distance. Position the target so the center X has only one leg (center of X) represented.

14. Zoom into the target area as described in the steps above.

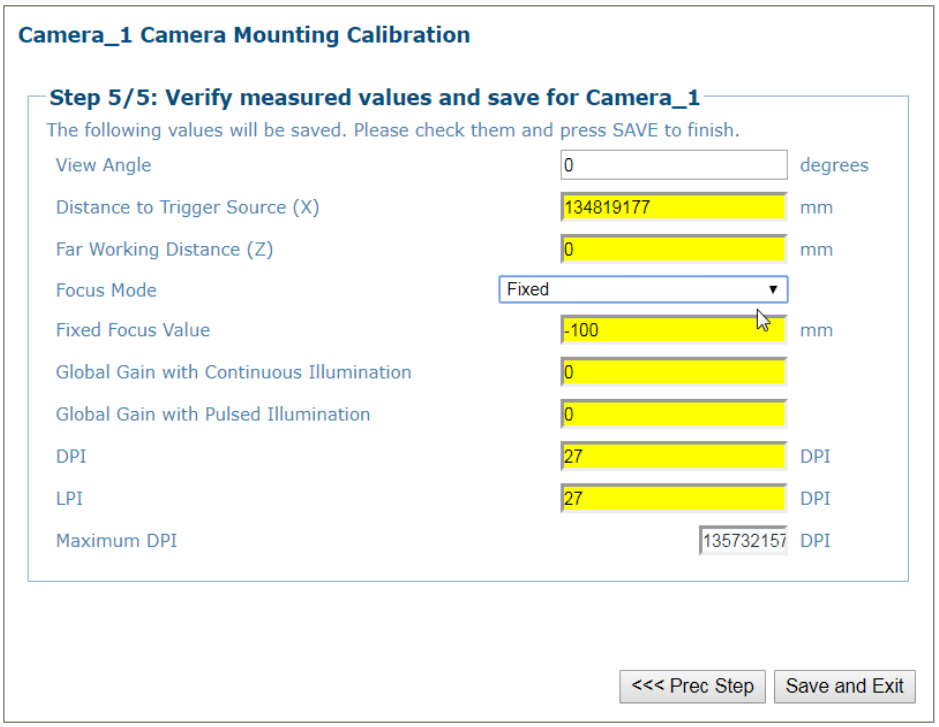
15. Click **Next Step >>>. The Step 4/5 Mounting Calibration Window** opens.



16. Enter the **Target height** (top mount AV7000) **or distance from farthest side** mounted AV7000) **(H).**

17. Enter **Distance of view line to reference (D).** This is the distance from DM3610, RangeFinder, or Light Curtain to the view line.

18. Select **Next >>>.** The **Step 5/5 Mounting Calibration Window** opens.



19. Select Fixed or Profile from the **Focus Mode** drop-down, if necessary.

20. The **Mounting Calibration Wizard** displays the results of the static calibration. The yellow highlight indicates which fields will be changed in the XML file. These new parameters will automatically be used by the AV7000.

21. Click **Save and Exit.**

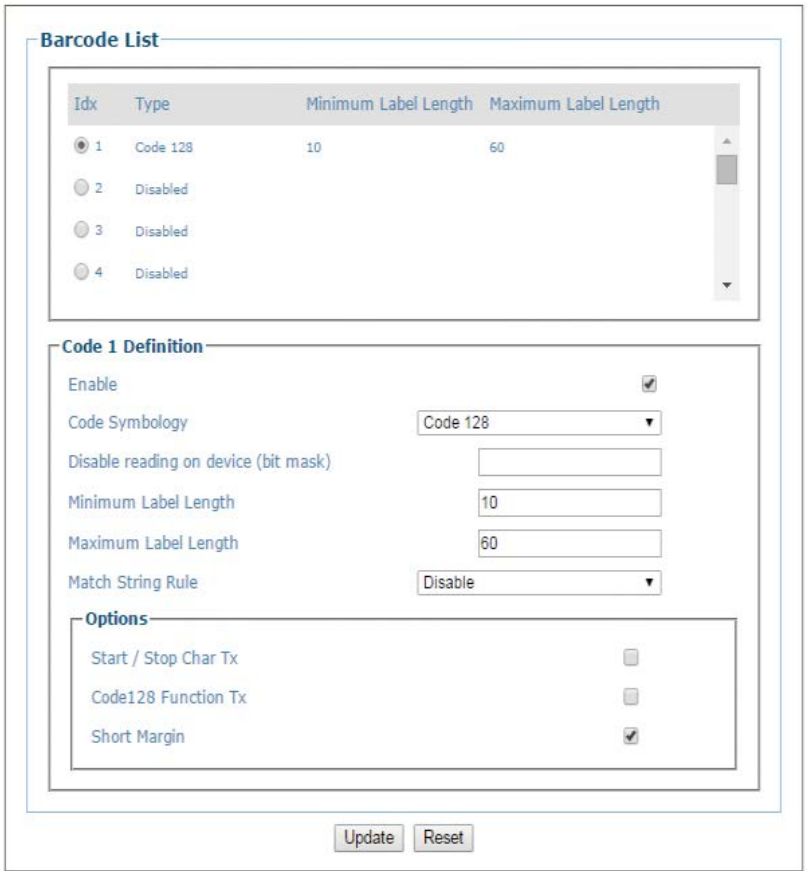
CALIBRATING AV7000: DYNAMIC CALIBRATION

Dynamic calibration is used to set up and calibrate a system in motion.

Follow these steps to configure e-Genius for Running Dynamic Calibration

1. The test target used for dynamic calibration uses 20 character Code 128 barcodes, so e-Genius must be configured to accept those codes.

2. In the menu tree under **Modify Settings**, navigate to **Global Settings | Barcode Settings | Barcode Settings Table.** The **Barcode Settings Table** window opens.



3. Set the barcode menu to read the **Picket Fence/Step Ladder Res Test Chart** (code 128 barcodes).

After calibration is completed, this barcode setting must be removed if it is not the customers expected barcode.

Preparing the Dynamic Calibration Test Box

1. Tape the **Dynamic Focus Target** and **Picket Fence/Step Ladder Res Test Chart** on the 460x300x150 mm [18x12x6 in] test box as shown.

2. Turn on the conveyor.
3. In e-Genius, navigate to **Diagnostics | System Status** and confirm that the belt speed is correct.

Belt Speed(mm/s)	1508
Belt Speed(fpm)	296
Total Packages	48
Good Reads	6
No Reads	25
Multiple Reads	17
Read Rate	47.92%
Reset Counts	

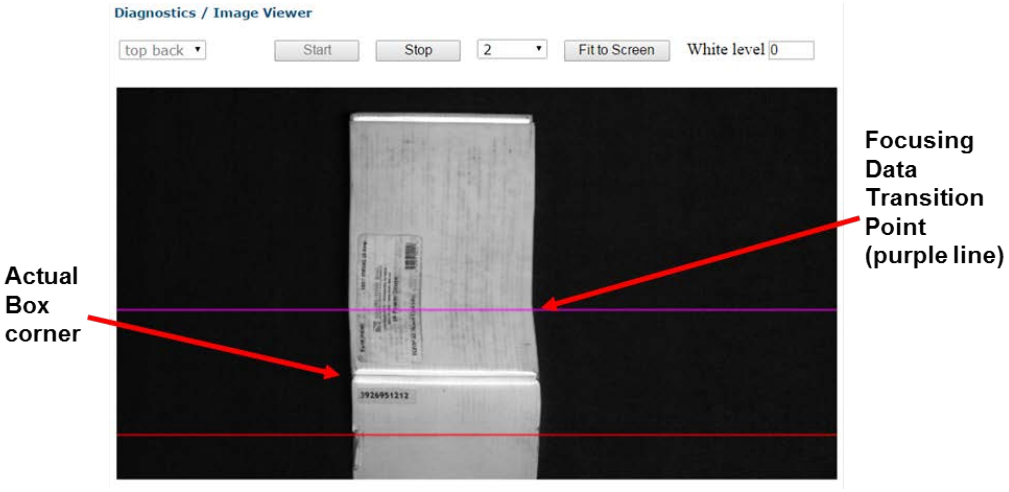
Calibrating Distance to Trigger Source (X)

1. In e-Genius, navigate to **Diagnostics | Image Viewer.** The **Image Viewer** window opens.

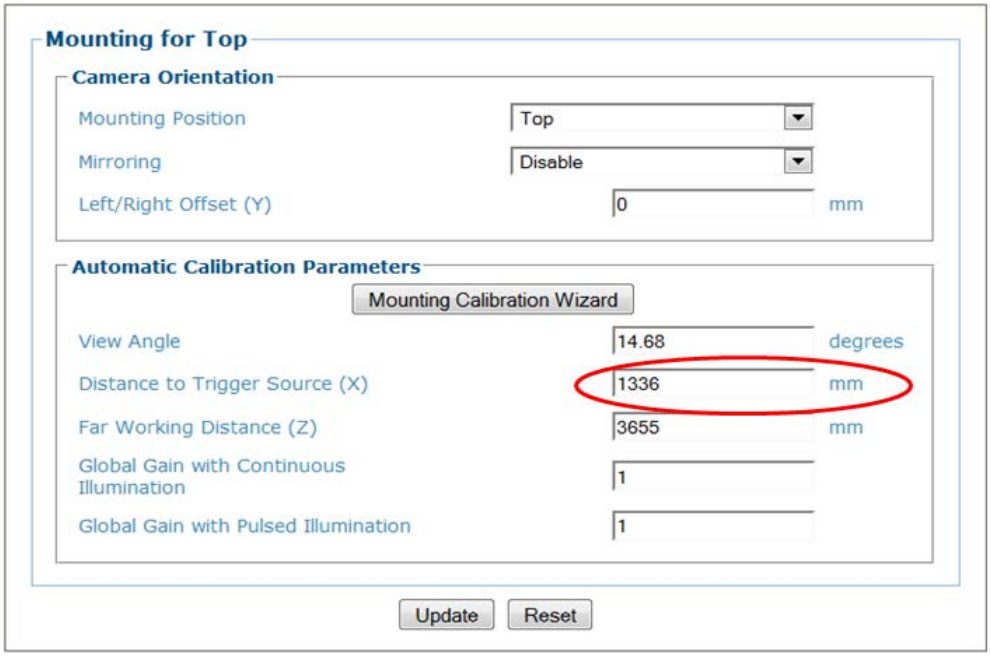
2. Select the camera to be calibrated from the first drop-down box.
3. Click **Start.**
4. Send a small box through the system (belt surface for top mount, and farthest distance from camera for side mount).

The **Image Viewer** captures an image of the box. The purple line in the image indicates the **Focusing Data Transition Point,** which should align with the corner of the box.

5. If the **Focusing Data Transition Point** (purple line) does not align with the leading corner of the box, the **Distance to Trigger Source (x)** must be modified to align the purple **Focusing Data Transition Point** line with the corner of the box.

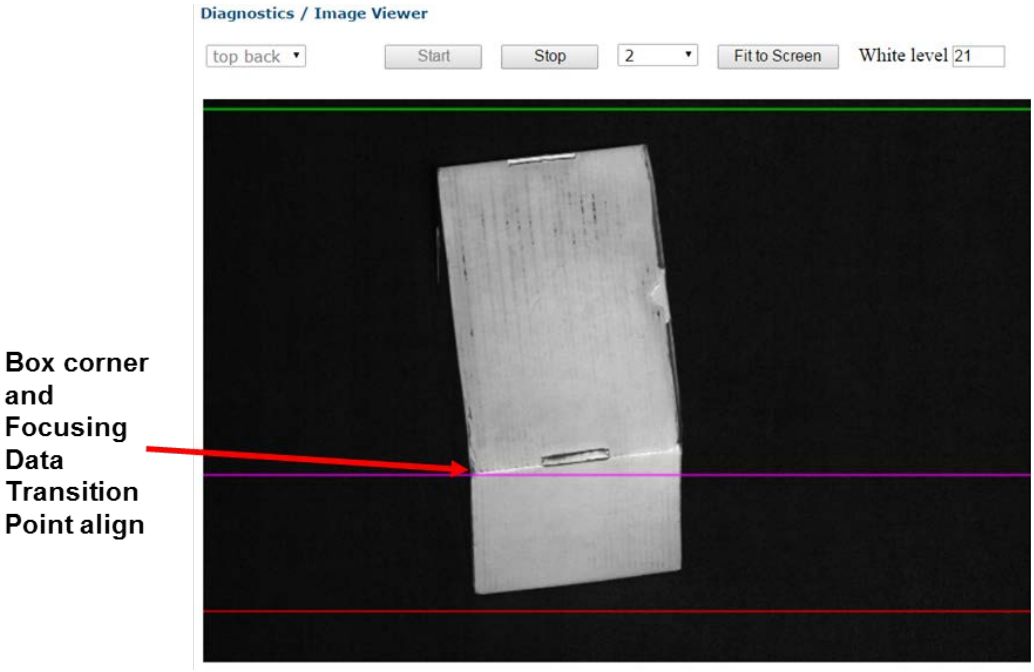


6. In the menu tree, navigate to **Modify Settings | Device Setting | Camera n (unit being calibrated) | Mounting.** The **Mounting** window opens.



7. Incrementally modify **Distance to Trigger Source (X)** to move the **Focusing Data Transition Point** (purple line) to the actual corner of the box.

8. **To do this,** re-run the **SMALL** box and adjust the **Distance to Trigger Source (X)** until the **Focusing Data Transition Point** aligns with the leading corner of the box.



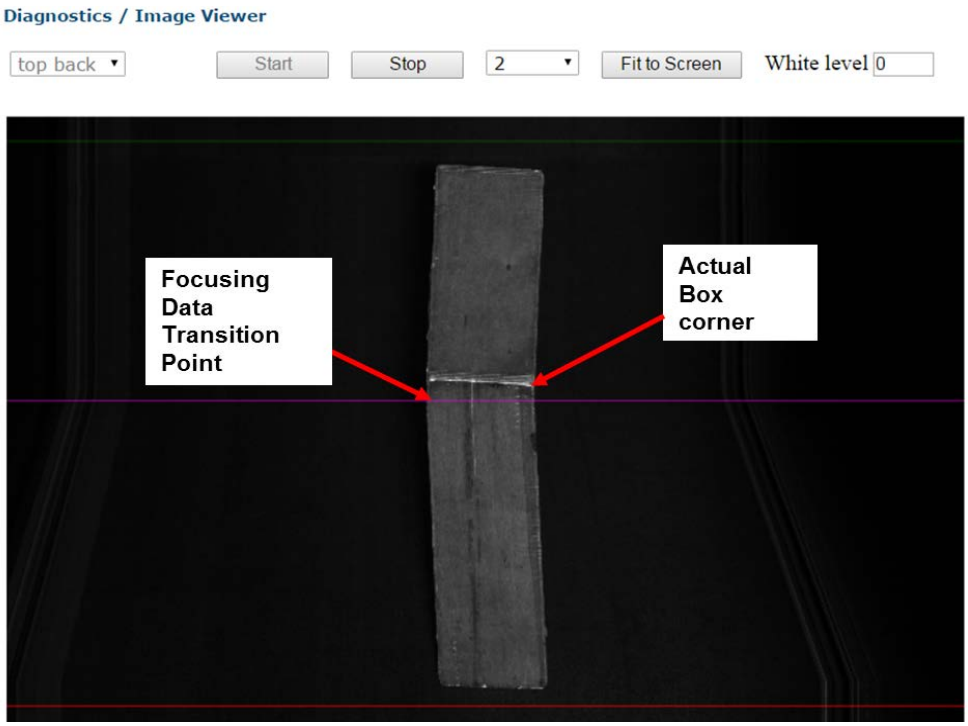
leading corner of the box should align with the purple Focusing Data nsition Point.

Calibrating Camera View Angle

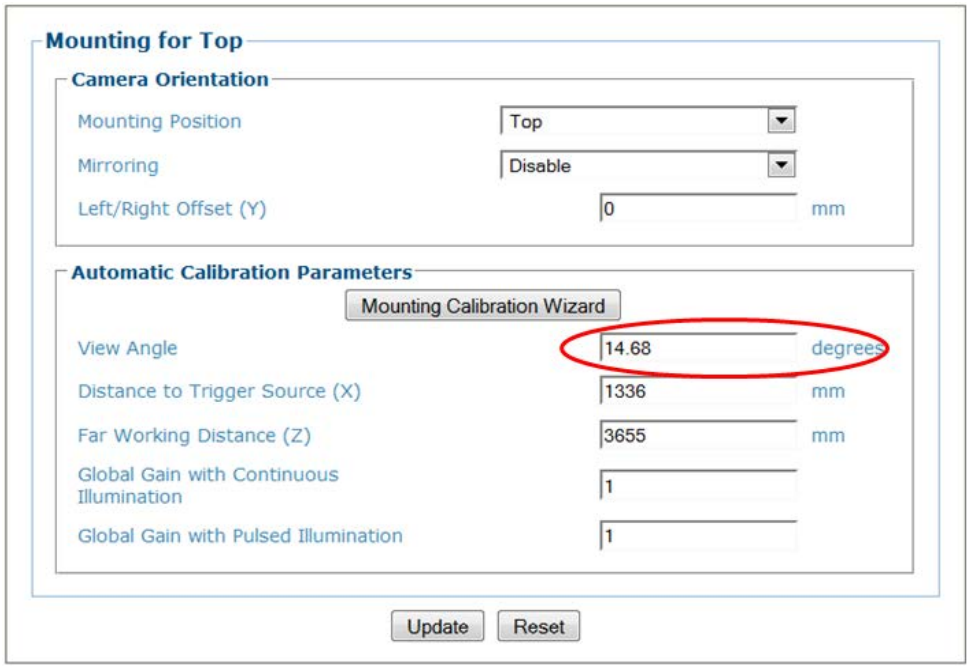
After the **Distance to Trigger Source (X)** is set correctly, set the camera view angle.

1. From the menu tree, navigate to **Diagnostic | Image Viewer.** The **Image Viewer** window opens.

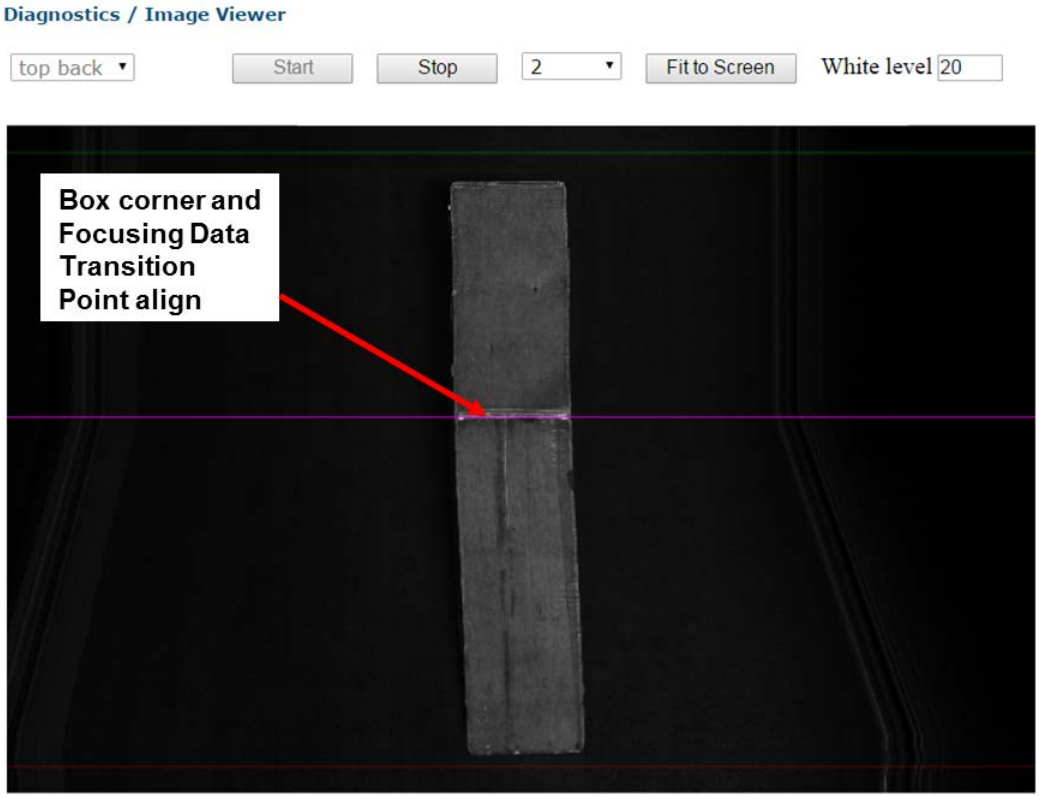
2. Run a box (TALL box for a top read, and NEAR box for a side read), through the system and identify the position of the **Focusing Data Transition Point** (purple line) in regards to the corner of the box.



3. In the menu tree, navigate to **Modify Settings | Device Setting | Camera n (unit being calibrated) | Mounting.** The **Mounting** window opens.



4. Incrementally modify the View Angle until the **Focusing Data Transition Point** aligns with the corner of the box.



5. Re-run the small box and confirm the **Distance to Trigger Source (X)** setting. Make adjustments as needed.

6. Re-run the tall box and confirm the **View Angle** setting. Repeat process until both the tall (or near distance for side read) and small (farthest distance for side read) boxes have the same **Focusing Data Transition Point** at the corner of the box.

Image Gain

The image gain affects the camera's ability to decode the barcodes by modifying the image exposure. Increased gain increases the brightness and clarity of an image at a given exposure.

1. From the menu tree, navigate to **Diagnostic | Image Viewer.** The **Image Viewer** window opens.
2. Again run the text box through the system with the targets facing the camera.
3. In the **Image Viewer,** hold the mouse pointer over any white area of the target.

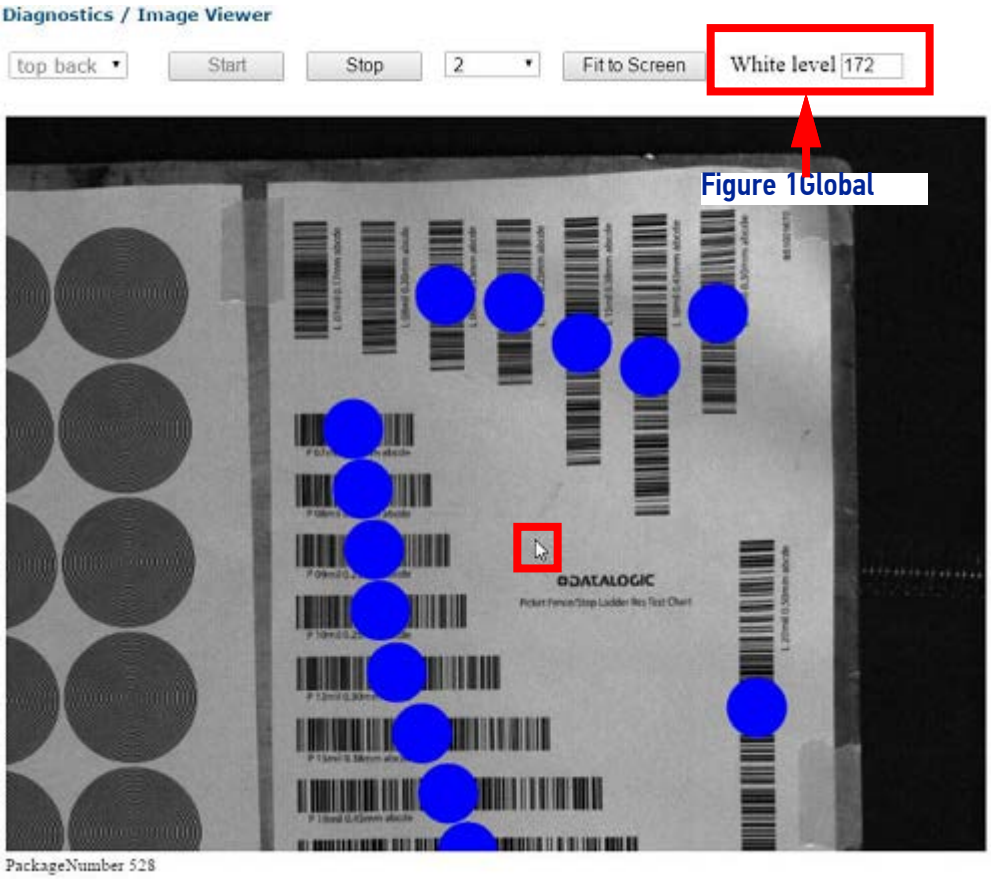
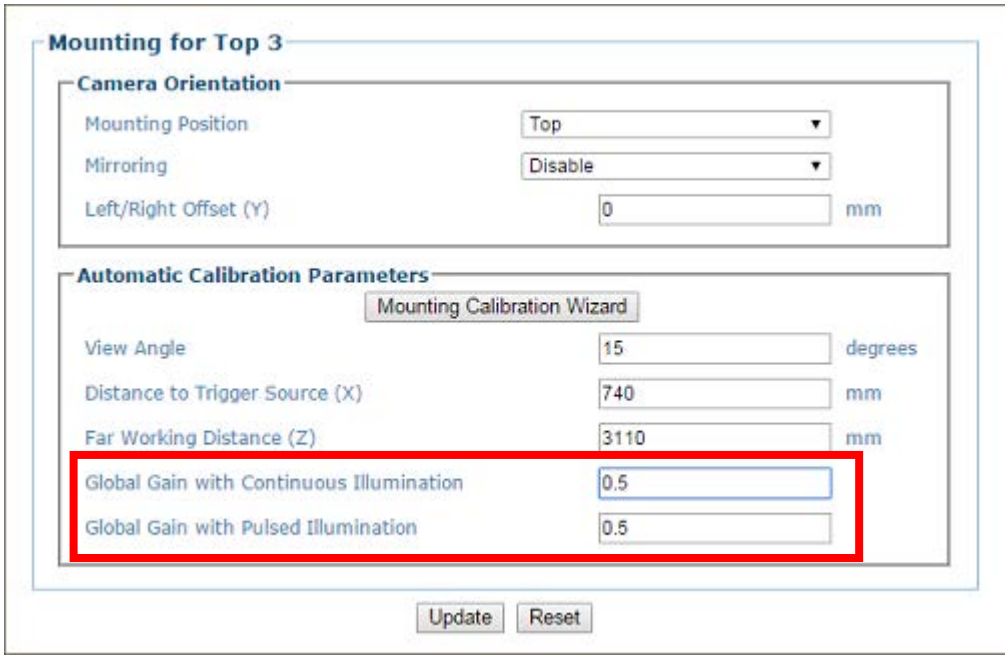


Figure 1Global

4. The gain value (White level) should fall between 180 and 200.
5. In the menu tree, navigate to **Modify Settings | Device Setting |Camera n (unit being calibrated) | Mounting.** The Mounting window opens.



NOTE: If pulsed illumination is enabled in Device Settings | Camera n | Imaging Global Gain with Pulsed Illumination should be adjusted. If pulsed illumination is not enabled, make adjustments to Global Gain with Continuous Illumination.

6. Adjust the gain until the white level shown in the Image Viewer is between 180 and 200.

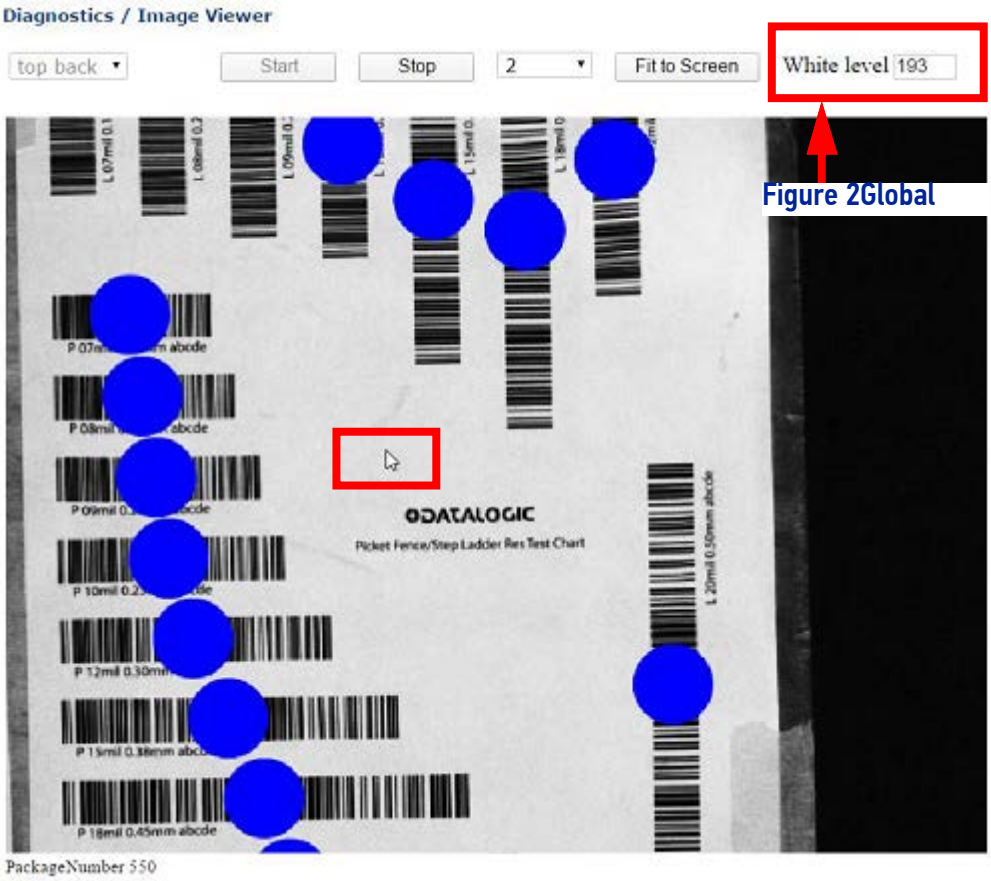


Figure 2Global

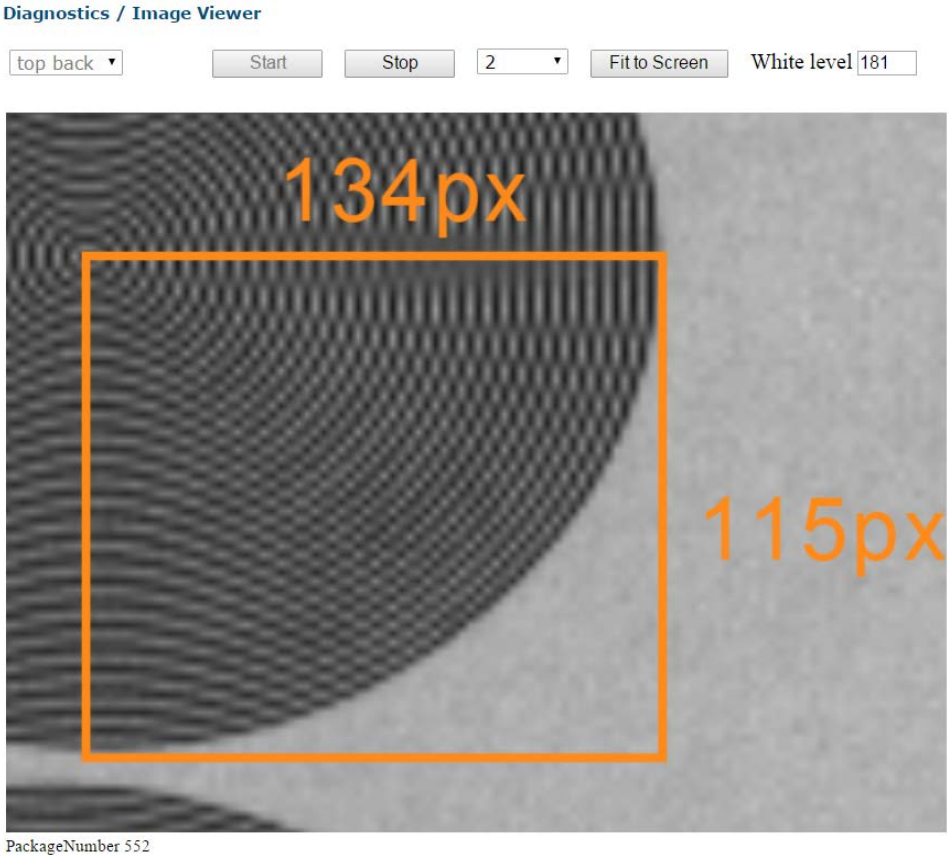
LPI/DPI Calibration

Lines Per Inch (LPI) and Dots Per Inch (DPI) values read by the AV7000 must be within 5% of each other. The goal is for the AV7000 to capture square pixels. This is especially important with certain barcodes and in cases where Optical Character Recognition (OCR) is required.

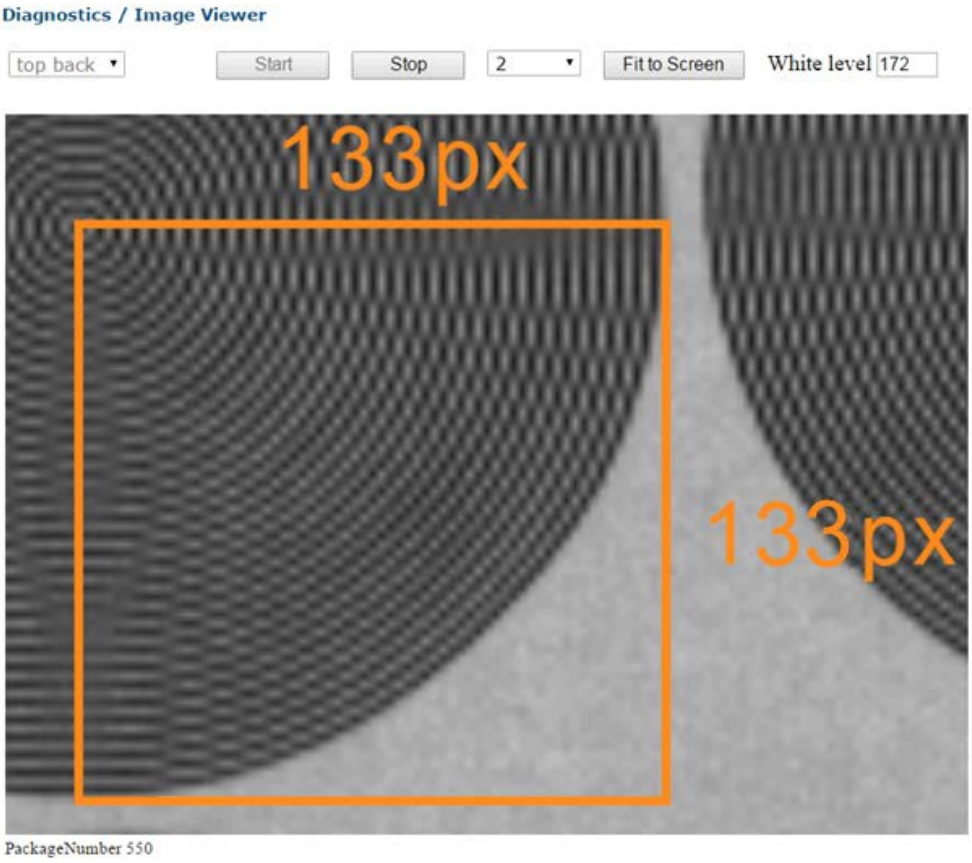
1. From the menu tree, navigate to **Diagnostic | Image Viewer**. The **Image Viewer** window opens.
2. Run the prepared test box through the system.
3. Click to zoom into the captured image of the **Dynamic Focus Target** so one circle fills the screen.

If necessary, hold the Shift key and click to zoom back out. Alternately, rotate the mouse wheel to zoom in or out.

4. While holding down the **CTRL** key, click and drag a box from the middle of the center dot to the outer edges of the outer circle as shown below. If this image is obviously elongated, then corrections must be made.



5. If the LPI/DPI are not within 5% then a parameter is likely incorrect. Run the install wizard again to correct the problem. If that doesn't correct the problem, consult Datalogic Support for possible solutions.



Adjusting the Focus (Far Working Distance (Z))

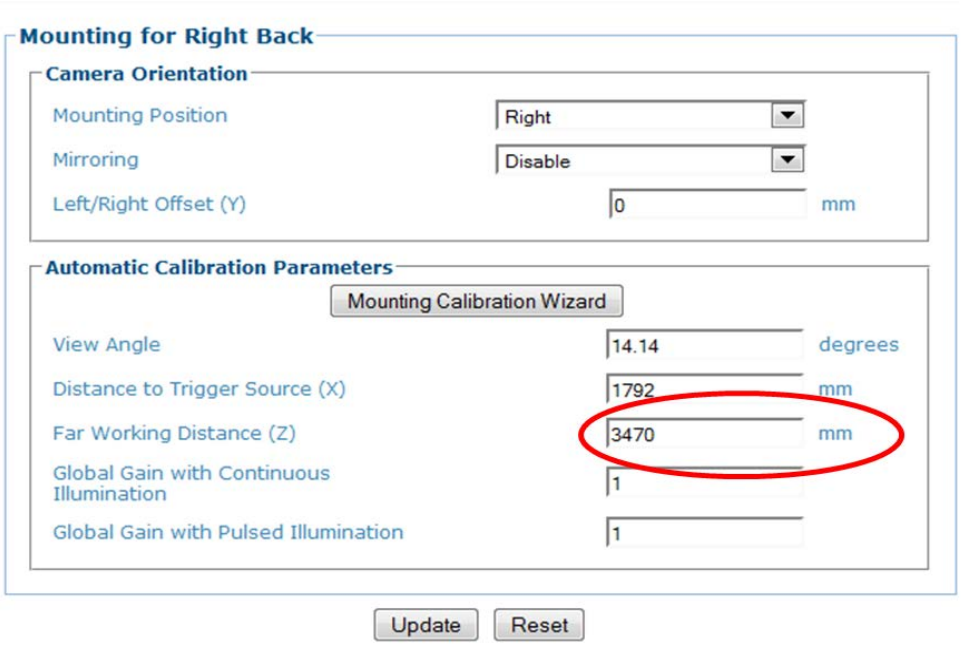
The Far Working Distance must be adjusted to read an equal number of step ladder and picket fence barcodes on the **Picket Fence/Step Ladder Test Chart.**

1. Place the **Picket Fence/Step Ladder Test Chart** on the test box. The first part of the data of the barcode indicates the mil/mm size of the narrow element.

2. Run a box with the **Picket Fence/Step Ladder Test Chart** through the system. The goal is to have the same number of picket fence and ladder barcodes decoded. In

the following example, there are more barcodes decoded in one orientation than the other. This indicates that the camera is not focused correctly.

3. In the menu tree, navigate to **Modify Settings | Device Setting | Camera n (unit being calibrated) | Mounting.** The **Mounting** window opens.



4. Adjust the **Far Working Distance (Z)** parameter incrementally and run the box through the system again.

The image below is an optimized focus example with the same number of barcodes decoded in ladder and picket fence orientation. However, there may be times when one orientation will have one more barcode decoded than the other.

PackageNumber 563

5. Continue running the box and making adjustments until the barcodes are in focus. Make sure that barcodes from both columns have been read.

Remove the test barcode from the symbologies menu when completed.

FINAL ACCEPTANCE TEST

Dynamic Read Test

Use the smallest, medium, and largest-sized system boxes for the dynamic read test.

- System smallest box: Used to test the far read distance from the camera
- System medium box: Used to test the center of the read area
- System tallest box: Used to test the near read distance from the camera

Code Placement

Obtain system code samples of various density and contrast.

Position the barcode on the surface of the box in the following manner (sample)

Repeat the following procedure for each AV7000 Camera in the tunnel or array.

For a front or back read the top surface of the box should have labels placed in the same pattern to accommodate testing both surfaces at the same time.

1. Place bar codes on the surface of the box facing the AV7000 mounting location.
2. Using the smallest box with the barcodes on the top surface, run the box on the left, center, and right portions of the Field of View. **All bar codes should be read.**
3. Using the medium box with the barcodes on the top surface, run the box on the left, center, and right portions of the Field of View. **All barcodes should be read.**
4. Using the largest box with the barcodes on the top surface, run the box on the left, center, and right portions of the Field of View. **All barcodes should be read.**
5. If there is a problem reading any of the barcodes, run the Image Viewer to view the codes. The barcodes used should reflect a sampling of the various codes to be read by the system.
   - Variation in contrast
   - Variation in barcode's X dimensions
6. Make sure all the barcodes are read successfully.

Other Camera Checks

Perform the following final camera checks:

1. Confirm communication with host.
   - Serial (if applicable)
   - Ethernet (if applicable)
   - Confirm Protocol Index (if applicable)
2. Observe the System in Action.
3. Confirm that all cameras are reading the barcode correctly and that the scan point is communicating to the host.

CHAPTER 5
TRIGGER AND FOCUSING DEVICE SETUP AND CALIBRATION

FOCUSING DEVICES

The AV7000 focusing position is computed by the camera based on the position of the parcel triggered and/or measured by a focusing device. The Datalogic focusing devices may be one or more of the following:

- S-60 Photocell
- AS1 AREAscan™
- DLA Light Curtain (LCC-75xx AV7 Light Curtain)
- STI Light Curtain
- S-85 Positioning Sensor (DK-502 Kit)
- DM3610 Dimensioner
- DLA RangeFinder

This section provides detailed procedures on setup and calibration of your AV7000 Camera and the necessary focusing devices installed for your system.

NOTE: Though it is unlikely to happen, a DM3610 and RangeFinder cannot be installed and configured for focusing on the same system.

NOTE: The procedures outlined in this chapter should only be performed by a Datalogic trained technician. For further information on training, contact us through the Datalogic website at www.datalogic.com.

WHAT YOU WILL NEED

NOTE: Items listed below are not required for every focusing option.

- Application Drawing (for structure, camera, mirror, sensor and focusing device positioning)
- Application Specifications
- Laptop PC
- Tape Measure
- Sync Ethernet Cable Adapter
- Installation Kit (Test Boxes) (included with AV7000)
- CH-3 Autofocus Test Chart (included with AV7000)
- Dynamic Focus Target (included with AV7000)
- Picket Fence/Step Ladder Test Chart
- RangerOScope (software): Download from **e-Genius, Utilities | Download Tools** window. Click **RangeFinder Tools** (Only when using RangeFinder for focusing)
- CodeWord Viewer: Download (Only when using RangeFinder for focusing)
- Inventory All Equipment and Structure Parts

See .

FIRST-TIME STARTUP

On initial power-up, the AV7000 performs a series of self-diagnostic and LED tests. When the **STATUS** LED turns a steady green the power-up sequence is complete, and the camera is operational.

The AV7000 cameras are shipped from the factory with these defaults:

- **Default User ID:** setup (case sensitive)
- **Default Password:** DLAset (case sensitive)
- Control Panel Buttons Enabled
- IP address - **192.168.0.145 (setup/sync controller),** 192.168.3.10 (Host), and 10.0.40.20 (Image)

UNDERSTANDING DATALOGIC FOCUSING OPTIONS

There are several Datalogic focusing options available for the AV7000. Each option serves a different purpose in AV7000 systems. They can be used alone or in combination with one another. Below is a list of the available options and an explanation of their purpose. The following sections detail how to focus each device when used in an AV7000 system. Also **see the AVMulti online help for AV7000 Timing and Distance Diagrams.**

S-60 Photocell

The standard **S-60 Photoelectric sensor** is used in AV7000 Camera Fixed Focus systems to detect the presence of an item entering the scanning area. This device works best in

systems where packages are separated by an open space between the trailing edge of one package and the leading edge of the next.

AS1 AREAscan™

The **AS1 area sensors** represent the ideal solution for the detection of very small objects, even when passing in different positions inside the controlled height and width. They can also help avoid multiple triggers on irregular shaped packages.

DL Light Curtain (LCC-75xx AV7 Light Curtain)

The **DL Light Curtain** is used to detect the presence of objects as they enter the scanning area, as well as report the package heights ranging from 150 to 2500mm to the AV7000.

STI Light Curtain

The **STI Light Curtain** is a legacy light curtain device that also detects the presence and package heights of objects as they enter the scanning area.

S-85 Positioning Sensor (DK-502 Kit)

The **S85 distance sensor** with laser emission provides time of flight measurement between the S85 and an object located between it and the calibrated far distance.

DM3610 Dimensioner

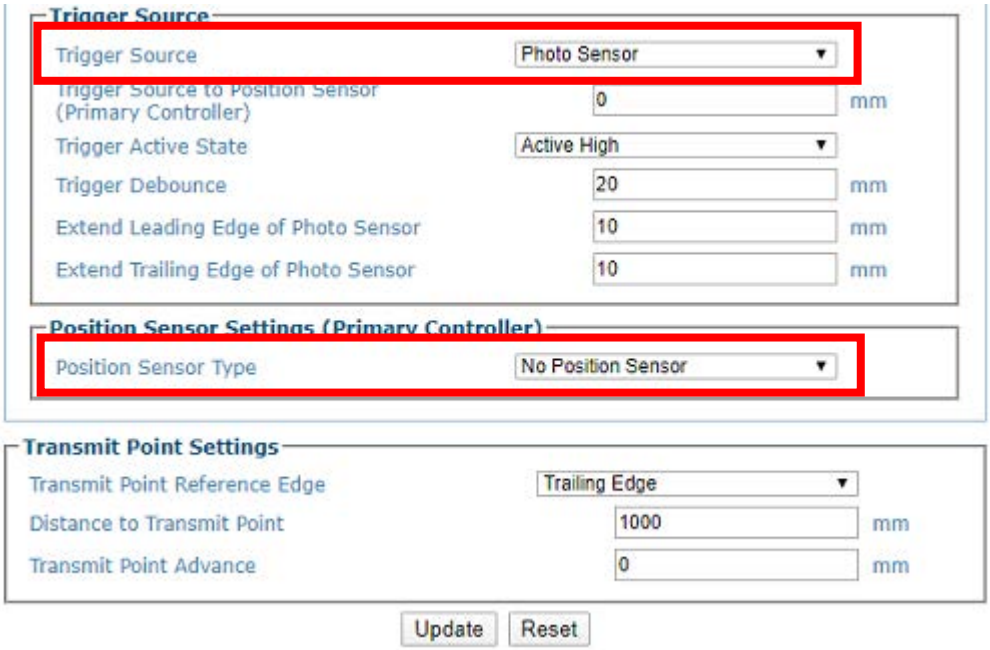
The **DM3610 Dimensioner** is used to detect the presence of products and report the package position, heights and sequence number to all cameras in the system as parcels enter the scanning area.

RangeFinder

The **RangeFinder** can be used to detect the presence of products as they enter the scanning area as well as report the package positions/heights and sequence number to all cameras in the system. RangeFinders used in dimensioning are calibrated to have an accuracy of 2.5 mm [0.1 in], 5 mm [0.2 in] or 13 mm [0.5 in].

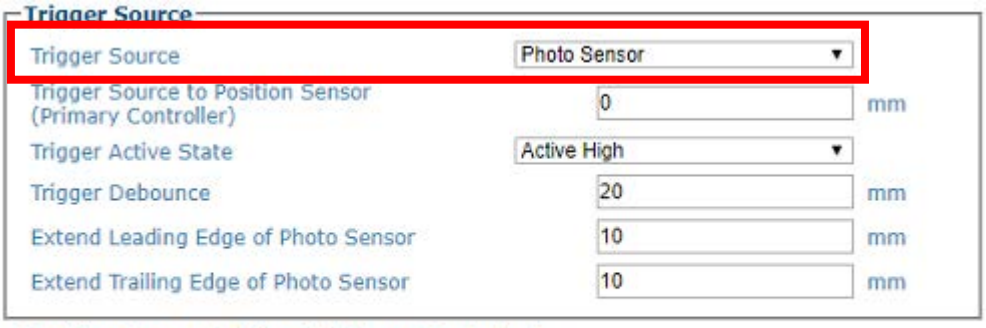
SETTING UP THE S-60 PHOTOCELL

Reference the **S-60 Installation Guide** (included with your S-60 kit) for complete information on connecting and aligning the Photocell. Make the following selections in the AV7000 e-Genius application **Operating Mode**.



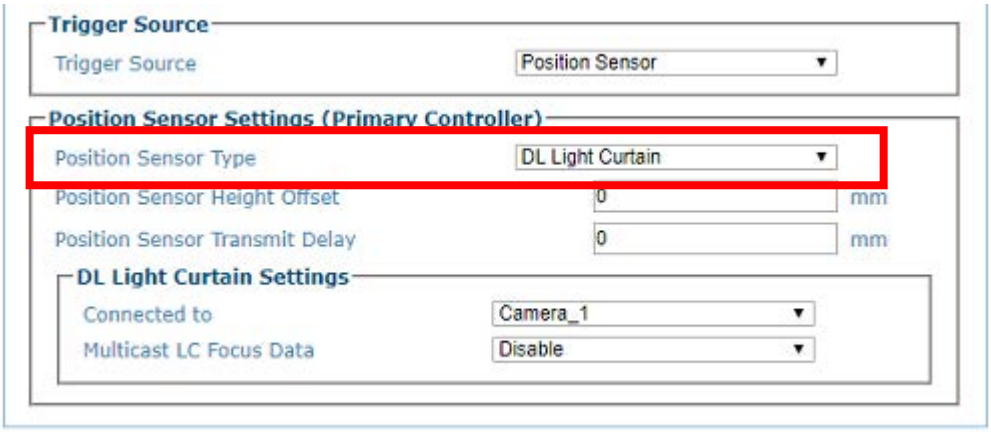
SETTING UP THE AS1 AREASCAN

Reference the **AS1 Series Instruction Manual** (included with your AS1 kit) for complete information on connecting and aligning the ASl. Make the following selections in the AV7000 e-Genius application **Operating Mode**.



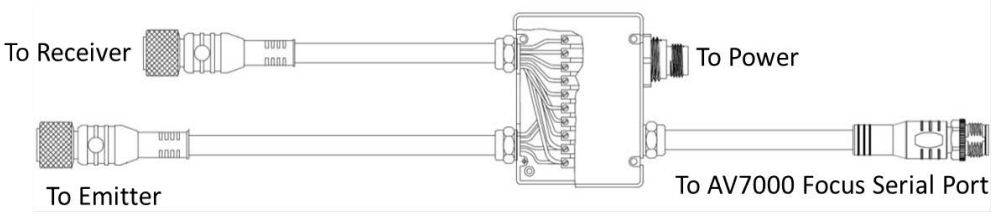
SETTING UP THE DS2 LIGHT CURTAIN

Reference the **DS2 Instruction Manual** available at www.datalogic.com for complete information on connecting and aligning the Light Curtain. Make the following selections in the AV7000 e-Genius application **Operating Mode**. The baud rate of the **DS2 light curtain is 19200.** Make sure the baud rate for the Focus Serial port in the AV7000 is set to match.



Connecting a DS2 Light Curtain to the AV7000

A special CVL-2403 Connection Cable is provided to attach the DS2 Light Curtain emitter and receiver to the AV7000 and a power source. See .



Power Options:	
If requiring an external Power Supply there are three options:	
PG-100-K01 POWER SUPPLY 60W KIT (EU)	93ACC0059
PG-100-K02 POWER SUPPLY 60W KIT (UK)	93ACC0060
PG-100-K03 POWER SUPPLY 60W KIT (US)	93ACC0058
If receiving power from a CBX box, use cable 95ACC2110 and connect as follows:	
	CBX box terminal
Brown and White twisted together	Power Vdc
Blue and Black twisted together	Power GND
Grey	Earth

Verify the following Receiver (CBX Box) DIP Switches:

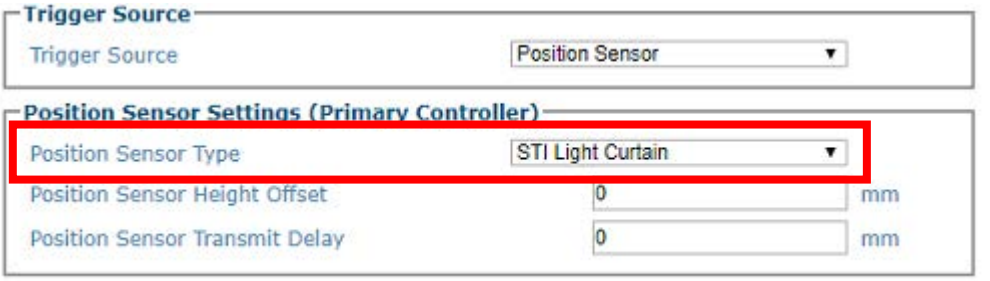
1 = OFF (down)

2-8 = ON (up)

Emitter Trimmer is set fully clockwise (maximum gain)

SETTING UP THE STI LIGHT CURTAIN

Reference the **STI Light Curtain Instruction Manual** available at STI.com for complete information on connecting and aligning the Light Curtain. Make the following selections in the AV7000 e-Genius application Operating Mode.



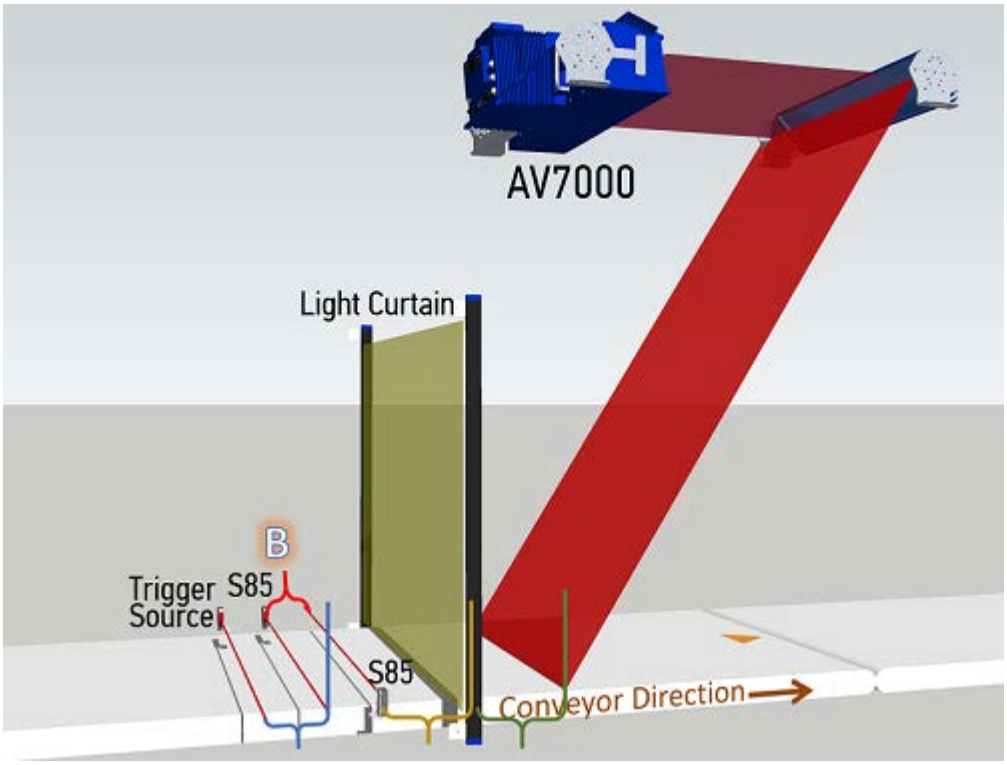
SETTING UP THE DK502 (S85) DISTANCE KIT

Reference the DK-502 Distance Kit Installation Manual for mounting and connecting the S85 Distance Sensor available at www.datalogic.com for information about the S85 position sensor.

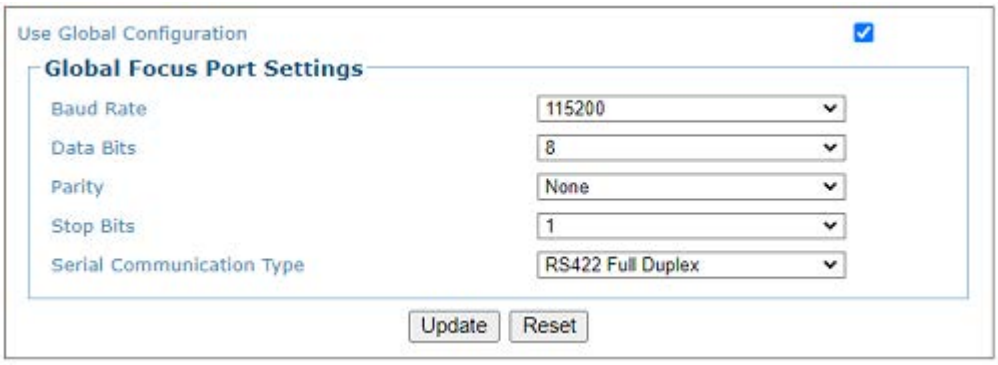
Mounting the S85 in an AV7000 System

In an AV7000 system, the S85 Distance Sensor must be mounted perpendicular to the conveyor. If there is more than one, the first S85 must be mounted at least 127mm (5 inches) downstream from the trigger photoeye. The trigger photoeye and downstream most S85 or Light Curtain must be mounted at least 127mm (5 inches) a part. The downstream most S85 or Light Curtain must be mounted at least 305mm (12 inches) upstream from the first camera scan line. There is no required distance between each S85/Light Curtain. See **AVMulti online help for AV7000 Timing and Distance Diagrams.**

.



1. Mount the S85(s) and DL light curtain (if required), as previously described.
2. Connect the S85(s) to the focus serial port of the controller AV7000 in the tunnel.
3. If two S85's are used, one S85 needs to be on the left side of the conveyor and the other on the right side. The left S85 is connected to the left side camera, the right S85 is connected to the right side camera.
4. Set the focus serial port on each camera with an S85 connected, to RS422 – 9600 8 N 1.



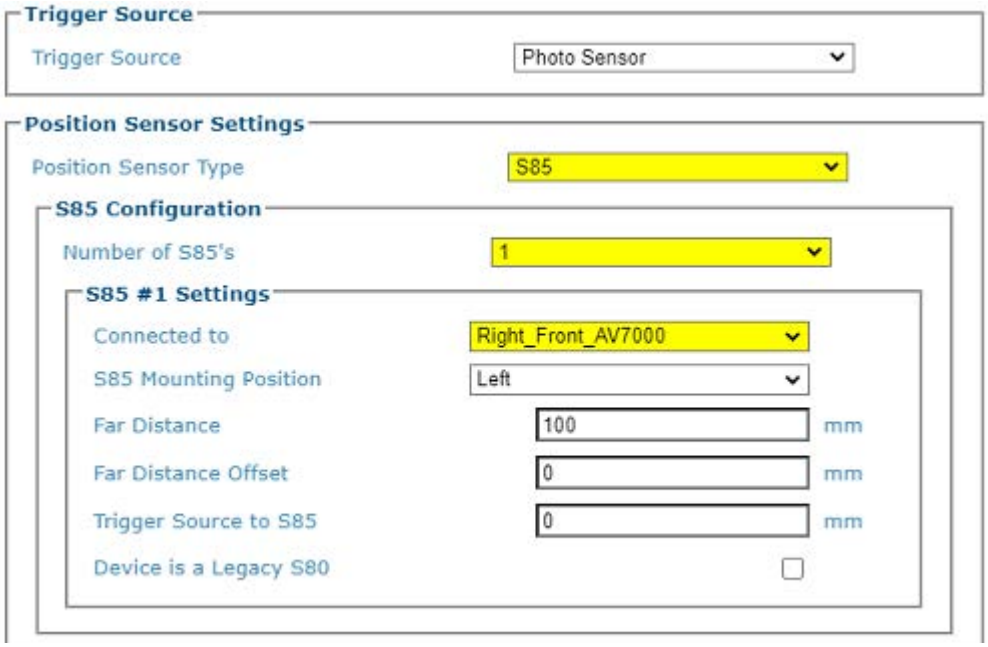
Make sure to connect the correct S85 to the correct camera.

5. The tach controller camera (with or without an S85 connected) tracks the connected S85's and DL light curtain to a point that is 127mm past the S85/LC that's located the furthest downstream from the PE (and closest to the first camera scanline).

S85 Setup and Calibration

To calibrate the S85 Distance Sensors, follow these steps:

1. In e-Genius under **Modify Settings**, navigate to **Global Settings / Operating Mode**. The Operating Mode window opens.



2. Select the **Photo Sensor** as **Trigger Source** from the drop-down.

3. Select the **Position Sensor Type** from the drop-down. Select S85 or S85 with DL Light Curtain.

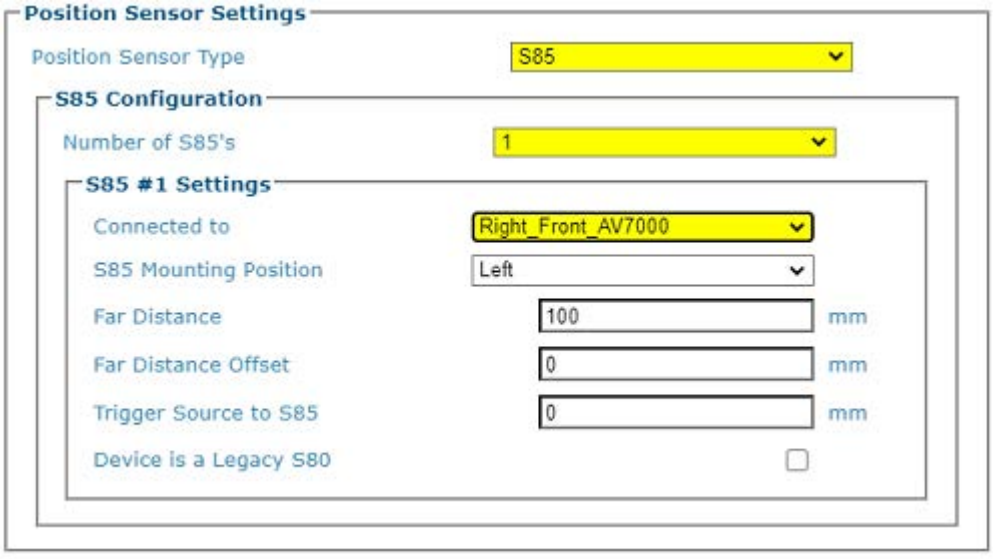
4. Enter the **Position Sensor Transmit Delay** as 127mm. This is required because the tach controller camera (with or without an S85 connected) tracks the connected S85's and DL light curtain to a point that is 127mm past the S85/LC that's located the furthest downstream from the PE (and closet to the first camera scanline).

5. Select 1, 2 or 3 from the **Number of S85's** drop-down.

6. For each S85 used, select the correct camera from the **Connected to** drop-down.

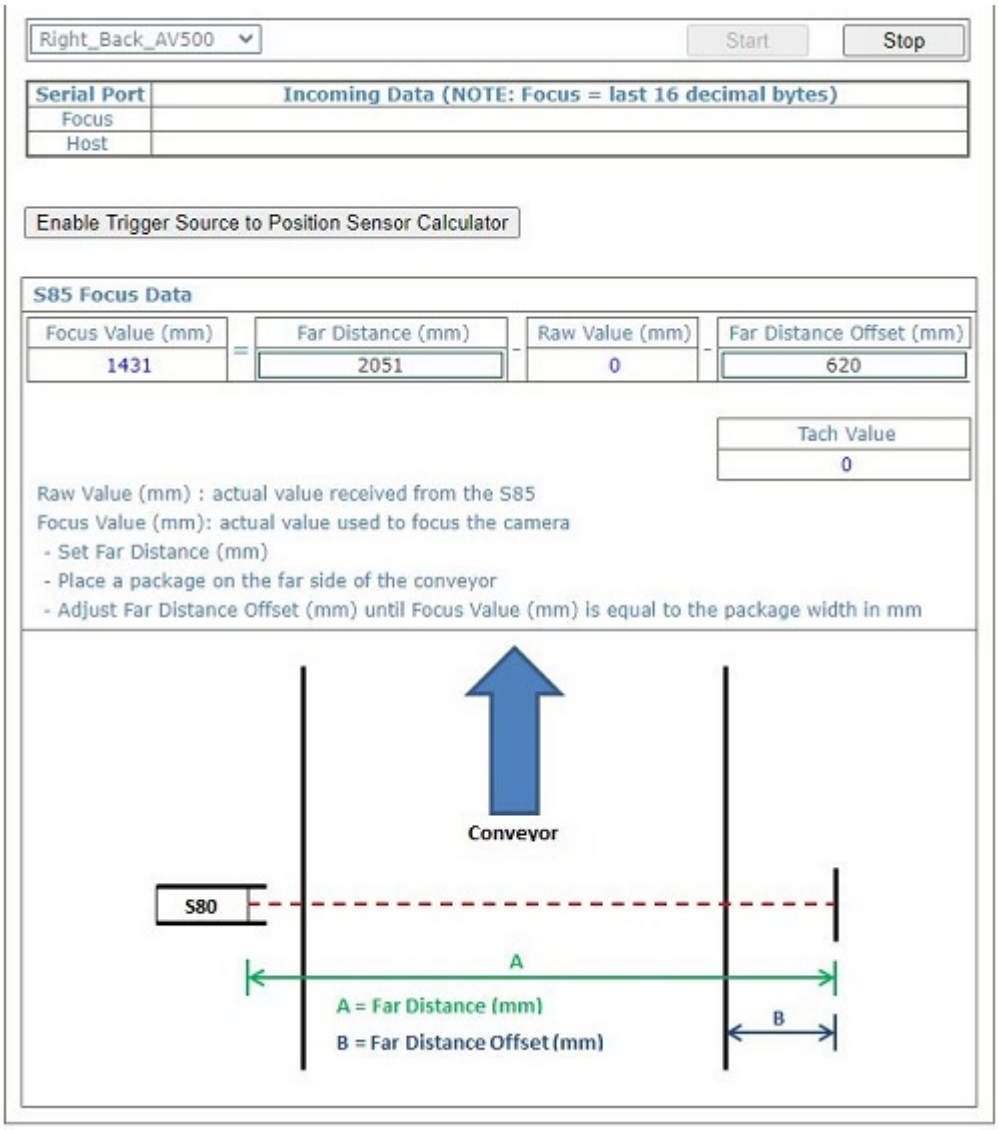
7. Measure the distance from the trigger source to the first S85.

8. Enter this value into the **Trigger Source to S85** field.



9. Click **Update** to save your changes.

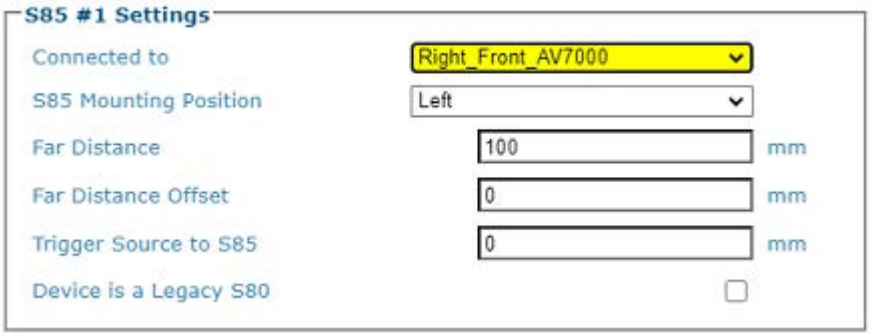
10. In **e-Genius** under Diagnostics, navigate to **Serial Comm Status.** The Serial Communications Status window opens.



11. Remove all objects from the conveyor belt and click the **Start** button.

12. Determine the Far Distance (A).

13. Enter the displayed distance in the **Operating Mode > Far Distance** field. Click **Update** to save your changes.



14. Place an object of known width on the far edge of the conveyor and adjust the Far Distance Offset (B) until the focus value equals the object width.

15. To adjust the distance, press enter each time you make an adjustment.

16. Enter this displayed value in the **Operating Mode > Far Distance Offset** field.

17. Click **Update** to save your changes.

SETTING UP THE DM3610 DIMENSIONER

DM3610 Dimensioners provide focus data for Datalogic cameras, including the AV7000, NVS9000, and AV6010. See**"DM3610 Dimensioner" on page 112**.

Refer to the **DM3610 Dimensioner Reference Manual** (or Two-Head Dimensioner Reference Manual) for complete information on installation and calibration of the DM3610. It is available for download from www.datalogic.com.

NOTE: For single Dimensioner applications, the DM3610 must be running software version 1.8.11 or greater. For multi-head applications, the DM3610's must be running 1.8.1 and the DC3000 must be version 1.3.60 or greater.

The Dimensioner scan line must be installed at least 500 mm [20 in] upstream from the nearest camera scan line.

The examples used in this guide use Imperial units i.e. inches. If the system is configured for metric, the unit of measure will be in mm.

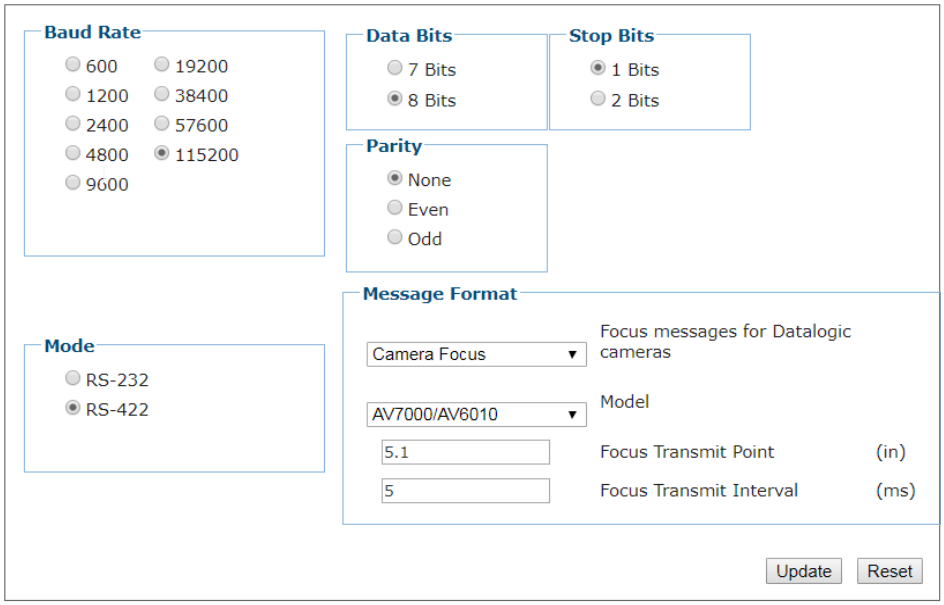
Remember to reset these parameters to the application specifications after the calibration is complete.

Preparation

Before beginning the DM3610 focusing process, a few preliminary settings are required.

NOTE: When working with a multi-head Dimensioning system, the focus setup steps apply to the unit designated as the "Tach Master" by the DC3000.

1. In the DM3610 e-Genius under **Modify Settings,** navigate to **Serial | Main** or **Aux** depending on the port wired to the AV7000 (typically **Main,** consult your application interconnect diagrams for details). The **Serial | Main** window opens.



2. Make sure the selected **Baud Rate** matches that of the AV7000 (AV7000 uses the main port, RS485 (RS422), at 115200).

3. Under **Message Format**, select **Camera Focus** from the **Focus messages for Datalogic cameras** drop-down list.

4. Select the **Model** of camera for which you are focusing.

5. Enter the **Focus Transmit Point.** This is the distance the DM3610 waits until after the AV7000 scan line has read, to transmit the message. This value correlates to a value in the AV7000 settings. Default is 8 inches.

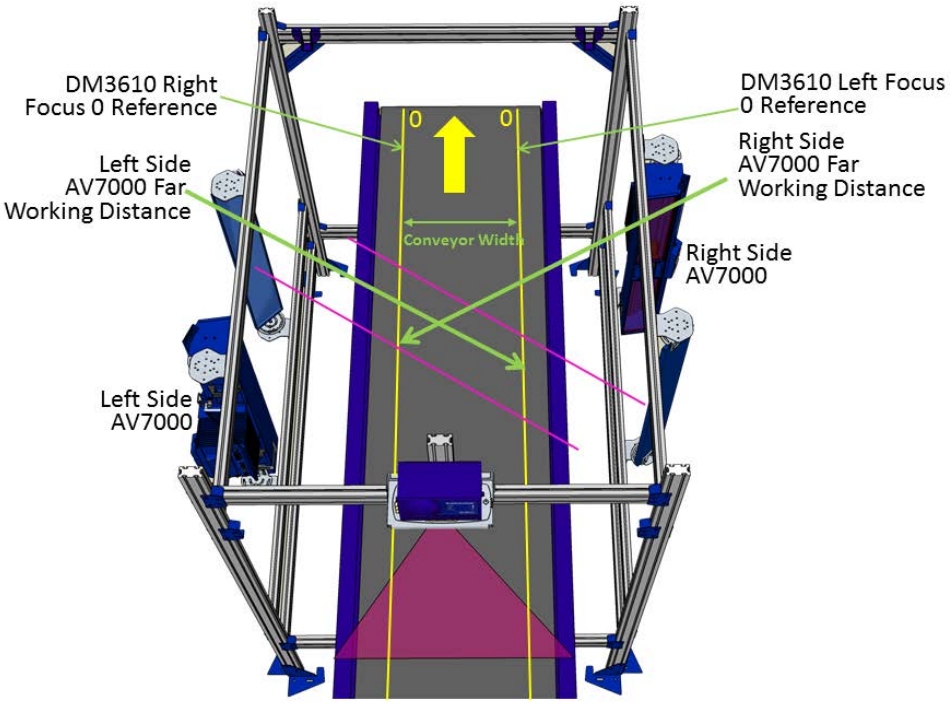
6. Enter the **Focus Transmit Interval.** This is the amount of milliseconds between data transmissions. It defines the frequency of the data transmissions from the DM3610(s).

7. Click **Update** to save the changes.

8. The distance between the far working distances of the cameras is considered the “Conveyor Width” and must also be entered in the **Conveyor Width** field in AV7000 **Global Settings | Operating Mode.**

Understanding DM3610 Focusing and AV7000 System Orientation

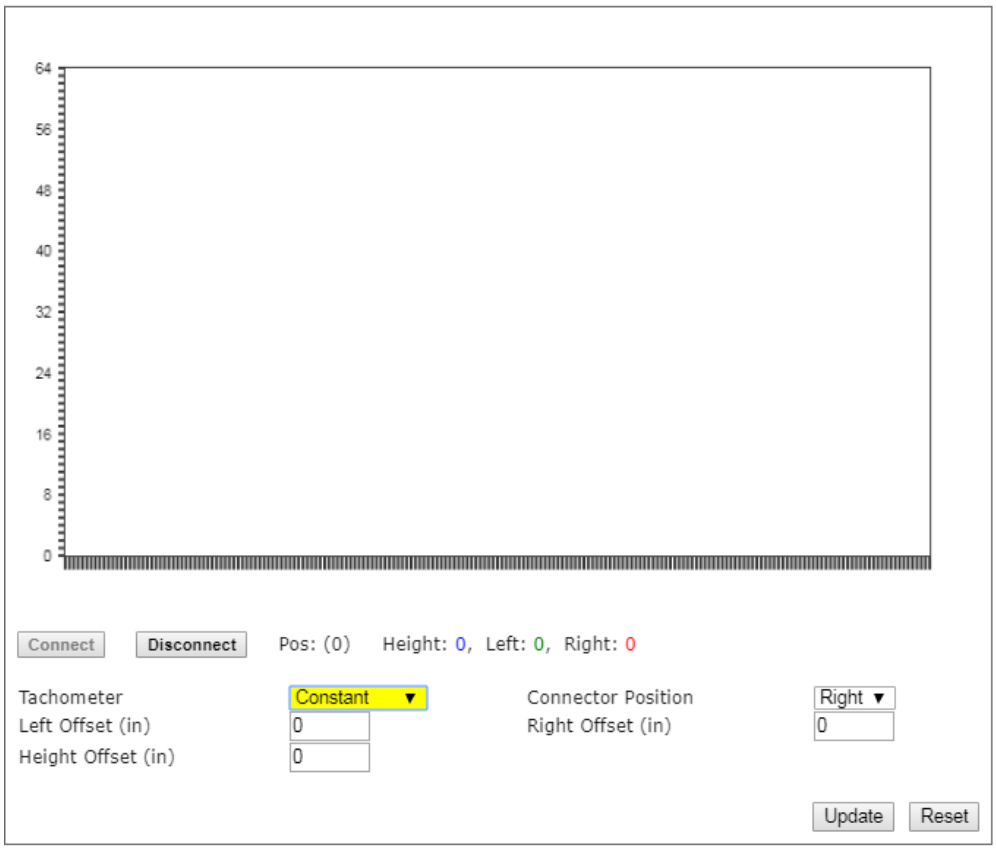
The goal of this focusing process is to correlate the DM3610 zero reference points to the far working distances of the cameras.



The DM3610 Left and Right Offsets focus the DM3610 at the **Far Working Distances (Left and Right)** of the side AV7000 cameras. These values are not necessarily the same. Reference the system application drawings for the exact prescribed Far Working Distances of each camera.

1. Navigate to **Diagnostics | Focus Setup.** The **Focus Setup** window opens.

NOTE: If you navigate away from the Focus Setup page, the Constant Tach setting will automatically reset to Hardware Tach. Reset it, to continue the focus setup process.



2. From the **Tachometer** drop-down list, select **Constant.**

3. Verify that the values displayed for **Left Offset, Right Offset,** and **Height Offset** are all set to 0.

4. Referencing the direction of conveyor travel, view the Dimensioner from an upstream position. Determine if the connectors located on the side of the unit face left or right, see the image below.

Connector Position Right

Connector Position Left

5. From the **Connector Position** drop-down, select **Left** or **Right.**

6. Click **Update** to save the changes.

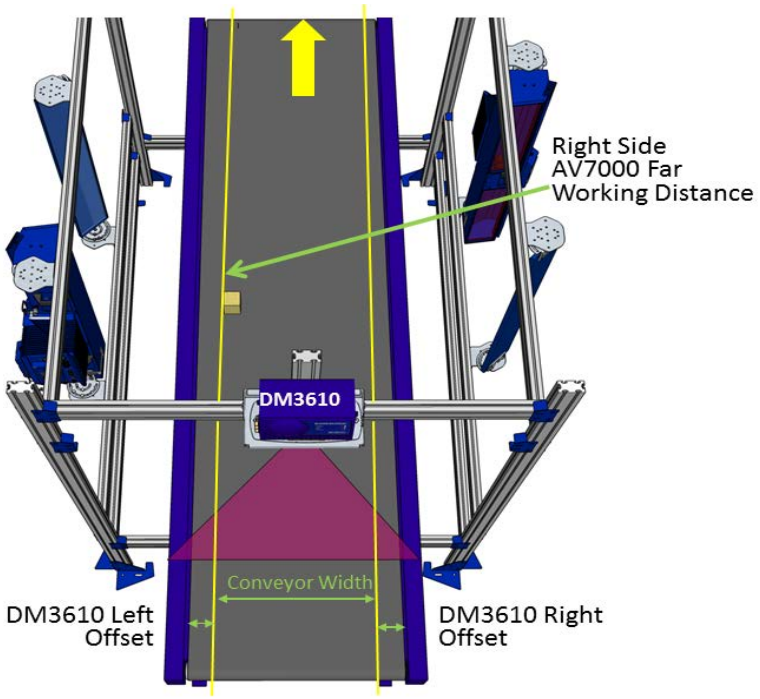
NOTE: When working with a DC3000 multi-head system, you must select a focus data source on the DC3000 Tach/Trigger/Transmit page. In applications involving side read cameras, select Head 1 and Head 2. For top read only applications, selecting a single head will suffice.

Adjusting DM3610 Left Focus Offset

1. Position a test box with a known width in the dimensioner line(s) so the side of the box is at the RIGHT side AV7000 far working distance as specified by the application's installation drawing. In this example we will be using a box with a 3" width.

When working with a DC3000 multi-head system, the text box must intercept all dimensioning lines

When working with a DC3000 based Dimensioning system, please allow time for the constant tach signal to synchronize between the Master and Slave units.



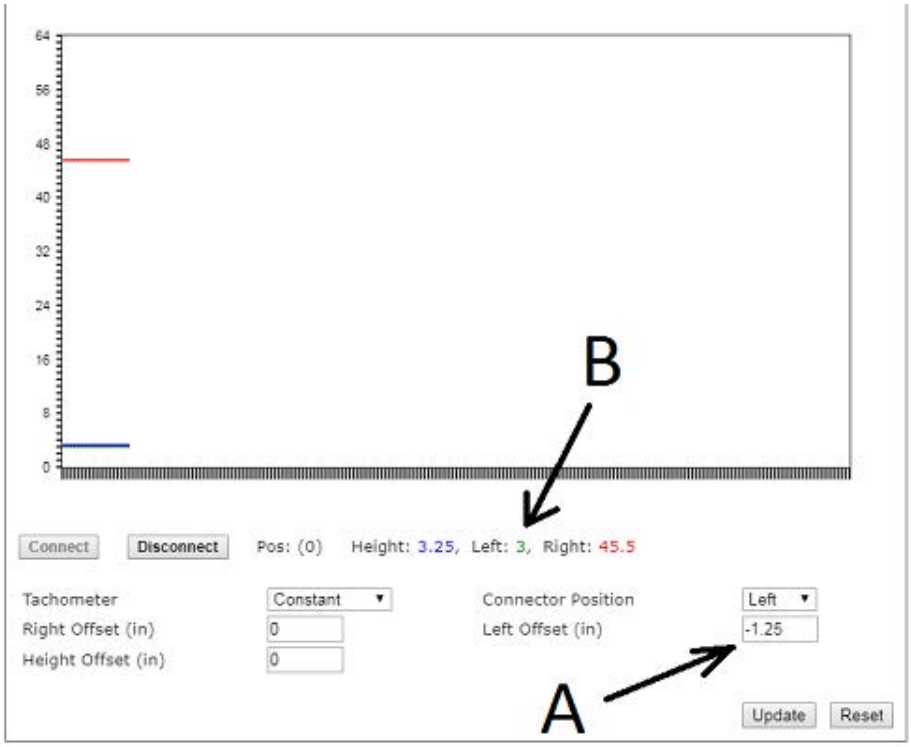
2. In the menu tree under **Diagnostics**, click **Focus Setup.** The **Focus Setup** Window opens.

3. View the displayed data and determine what the left value is. In the displayed example above, the value is 4.25”.

4. Subtract the width of the test box, in our example it is 3”, from the value displayed for Left.

4.25 – 3 = 1.25

5. Enter the result as a NEGATIVE value in the Left Offset field. In this case you will enter -1.25.



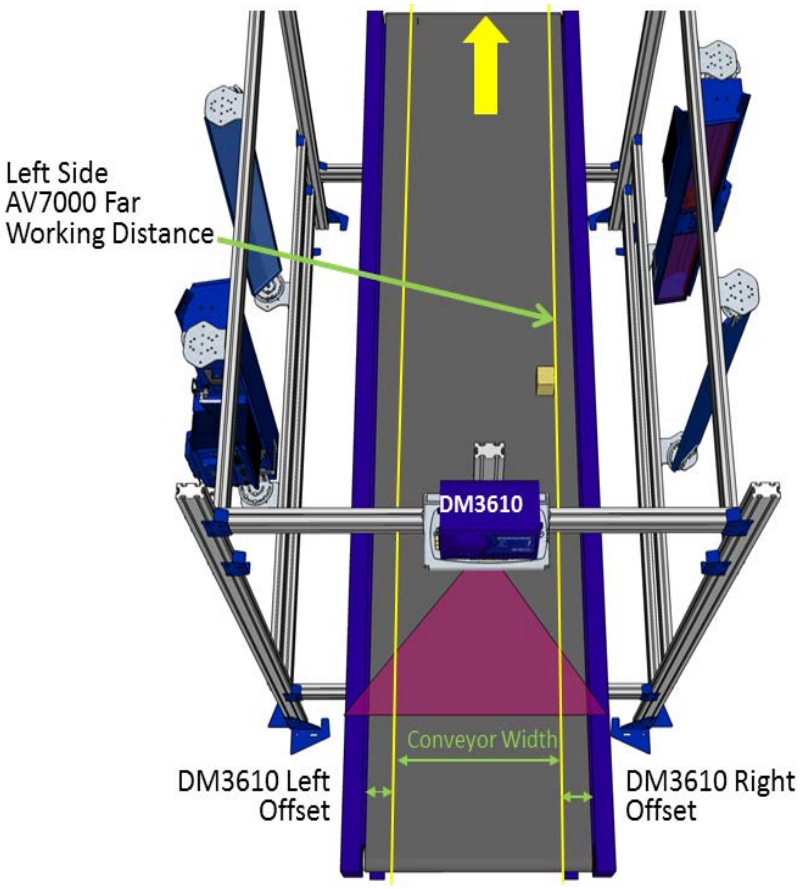
6. The position value displayed for the Left is now 3.

7. Click **Update** to save your changes.

Adjusting Right Focus Offset

NOTE: When working with a DC3000 multi-head based Dimensioning system, the text box must intercept all dimensioning lines.

1. Position the test box with a known width in the dimensioning line so the LEFT side of the box is at the RIGHT far working distance as specified by the application installation drawing.



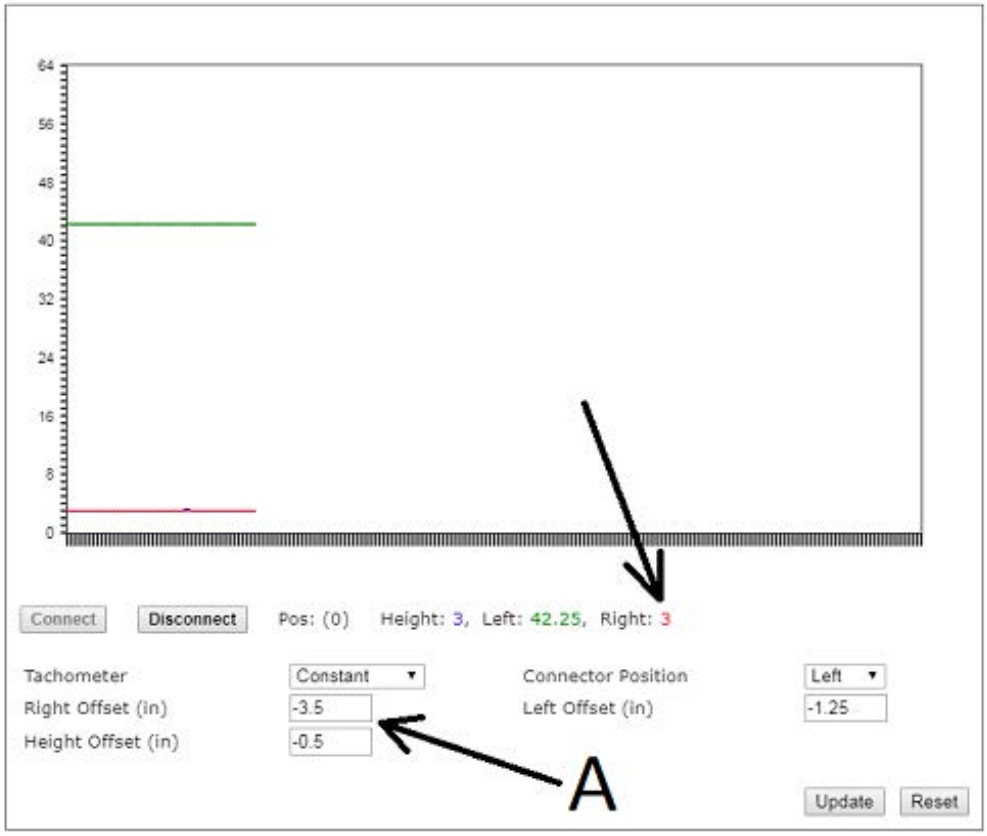
2. View the displayed data and determine what the **RIGHT** value is. In our example the value is 6.5”.

3. Subtract the width of the test box from the value displayed for RIGHT.

6.5 – 3 = 3.5

4. Enter the result into the RIGHT OFFSET field as a negative value, in our example it is -3.5.

5. Note the position value displayed for RIGHT is now 3.

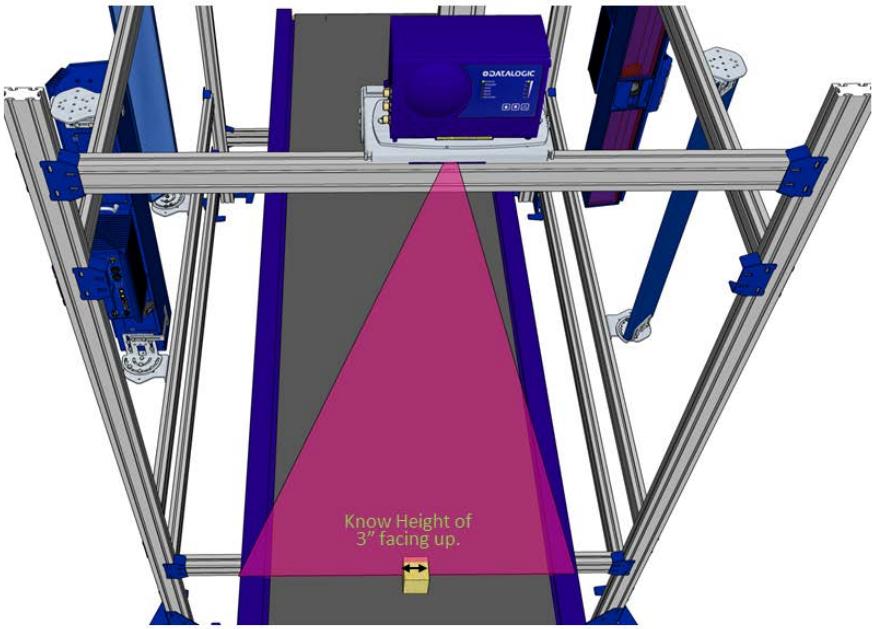


6. Click **Update** to save the changes.
7. Test the system by inducting a series of application objects and bar codes. Use the AV7000 imaging utility to verify that the cameras are focusing properly over the width and height of the conveyor.
8. Under **Tachometer,** select **Hardware/External** from the **Tach Source** drop-down list.
9. Click **Update.**

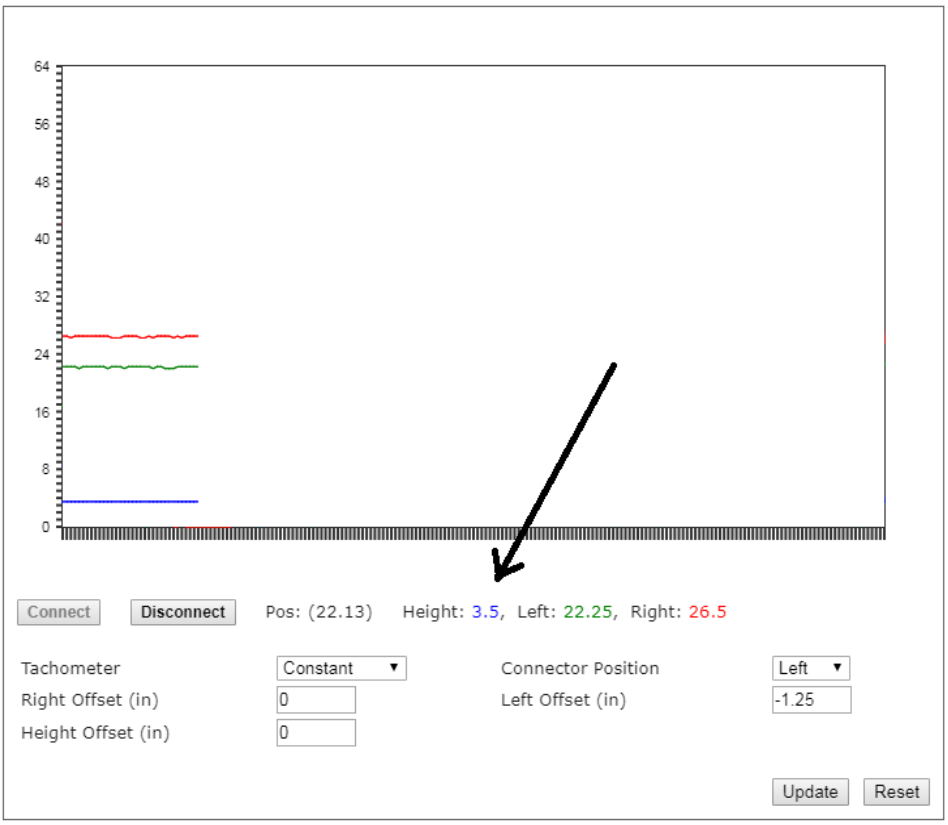
Adjusting Height Offset

When working with a DC3000 multi-head based Dimensioning system, the text box must intercept all dimensioning lines.

1. Place the same test box in the center of the dimensioning line so the known distance side is facing up.



2. Determine the Height value as displayed by the DM3610. In the image below the 3" test box displays a height of 3.5.

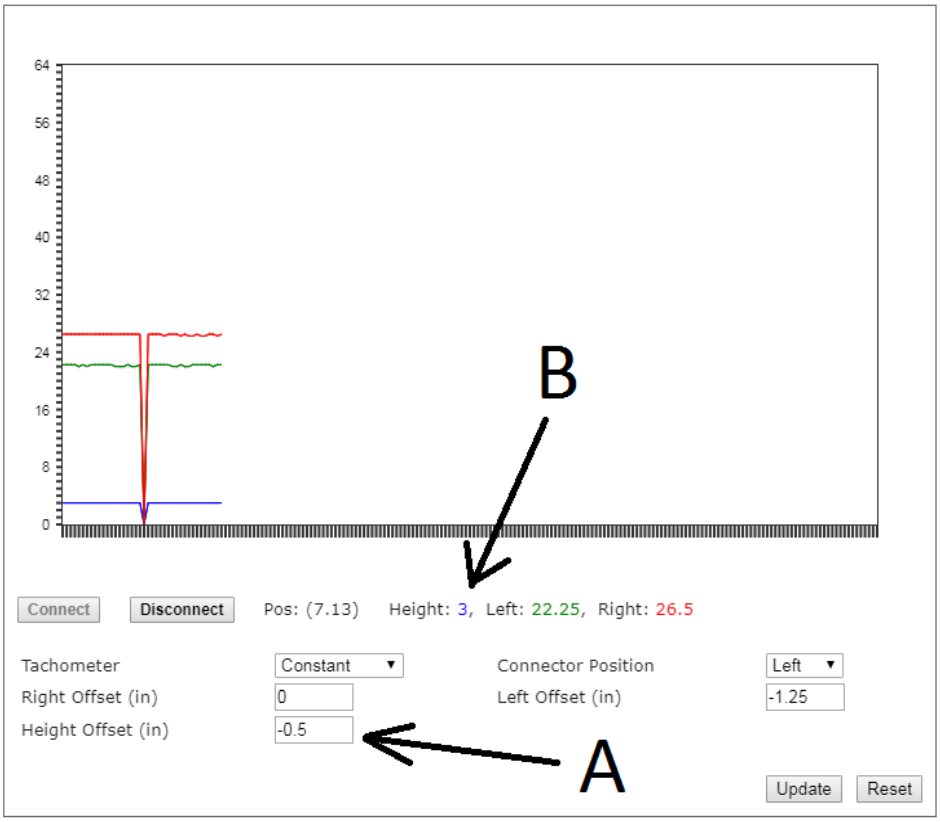


3. Subtract the test box height from the displayed height.

3.5 – 3 = 0.5

4. Enter the result as a NEGATIVE value in the Height Offset field. In this case you will enter -.5.

5. The Height Offset is now reflected in the Height value.



6. Click **Update** to save your changes.
7. Click on the **"Tachometer"** pull down menu and select "Hardware", then click "Update".
8. Test the system by induct a series of application objects and barcodes.
9. Use the AV7000 / NVS9000 / AV6010 imaging utility to verify that the cameras are focusing properly over the width and height of the conveyor.

SETTING UP THE RANGEFINDER

This process calibrates the Rangefinder focus data for AV7000 camera systems. The RangeFinder provides focus data for Datalogic cameras. See **"RangeFinder" on page 112**.

NOTE: These steps require downloading of the AV7000 tools.

1. Make sure the RangeFinder is mounted at the correct height (typically 1924 mm [75.75 in] from the left and right laser housings to the conveyor belt.

2. Attach an RJ45 cable from your PC to the **SYNC** port of the RangeFinder.

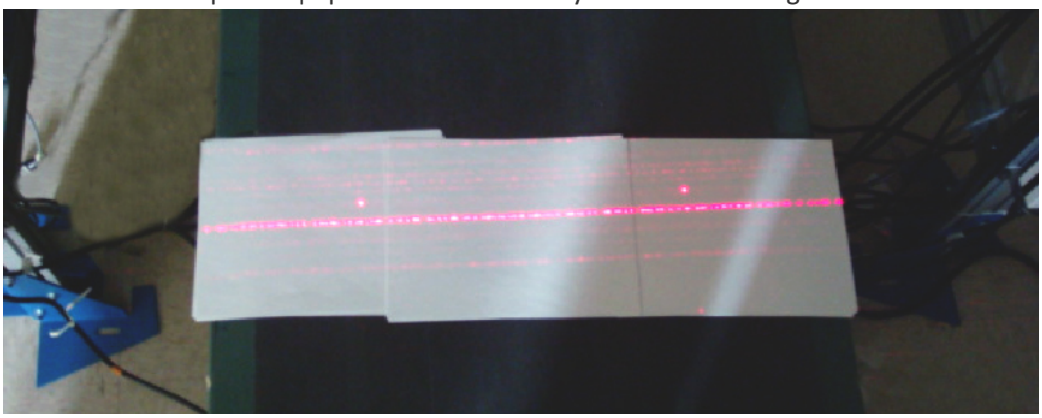
3. From a command prompt enter: (start>run>cmd) 0.

- telnet 192.168.0.40
- Free Scale login: **root**
- Password: **root**
- **set_gain** (this command will return with the current gain setting)

The RangerOScope and CodeWord Viewer allows for turning on/off the display for each laser. The image below identifies the right and left laser positions on the RangeFinder:

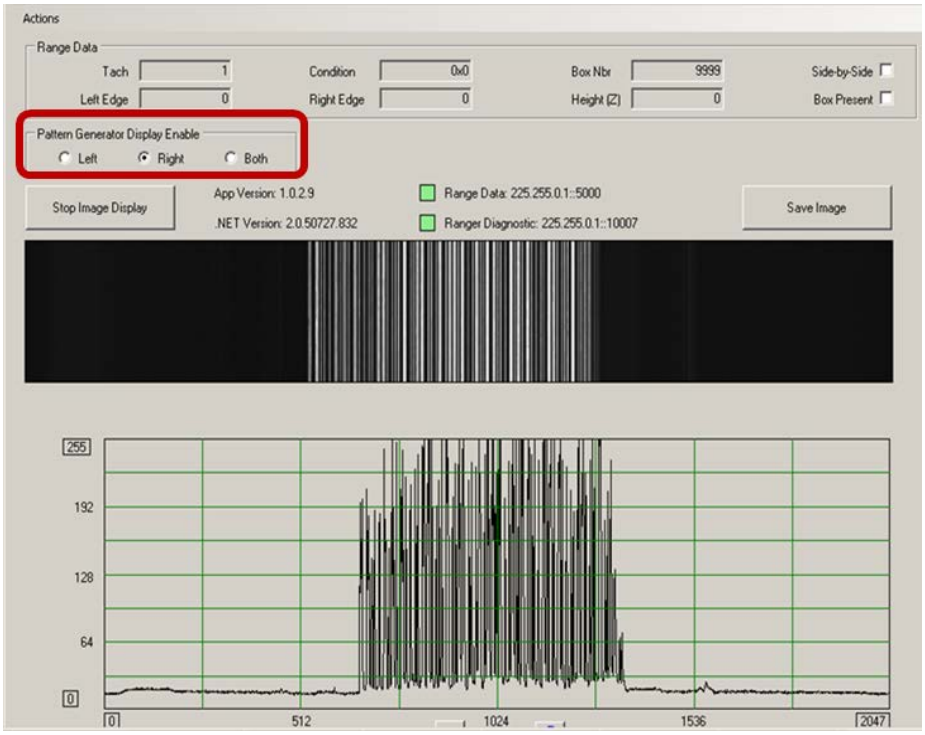
Setting the RangeFinder Gain

1. Place white printer paper across the conveyor under the RangeFinder



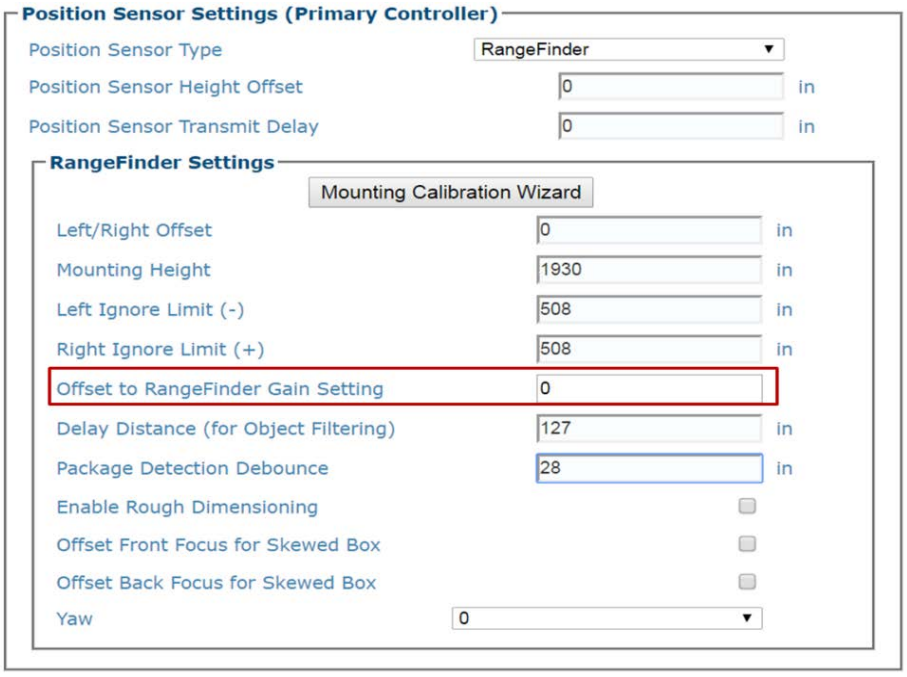
2. Open the **RangerOScope** application to view the signal.

3. Select the left pattern generator and compare its signal to the right pattern generator. Both signals should be symmetrical.

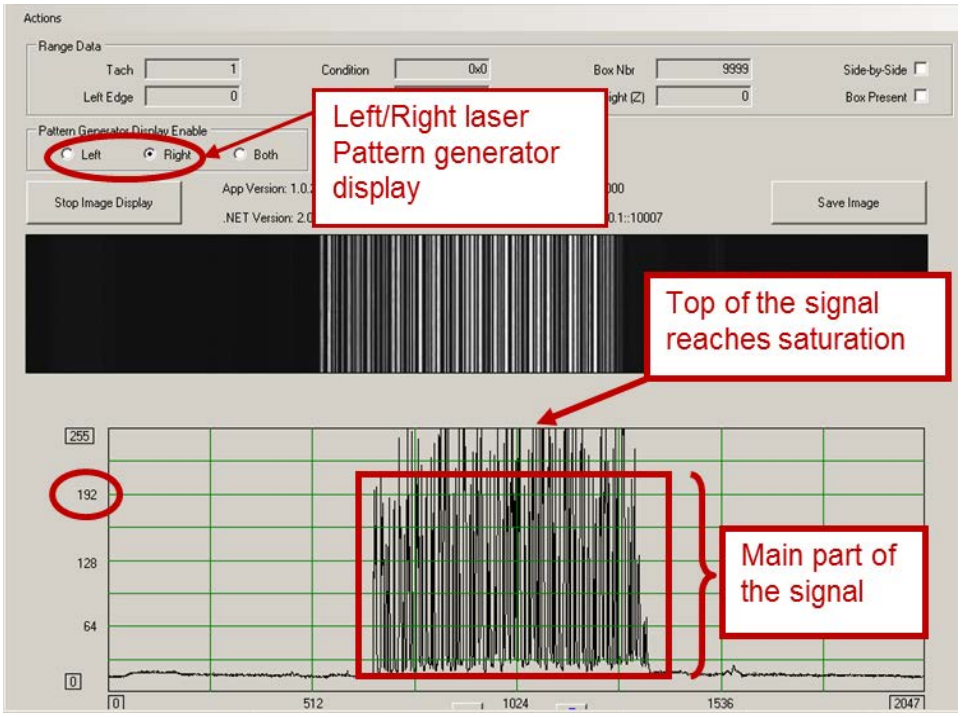


4. In **e-Genius** under **Modify Settings**, navigate to **Global Settings / Operating Mode.** The **Operating Mode** window opens.

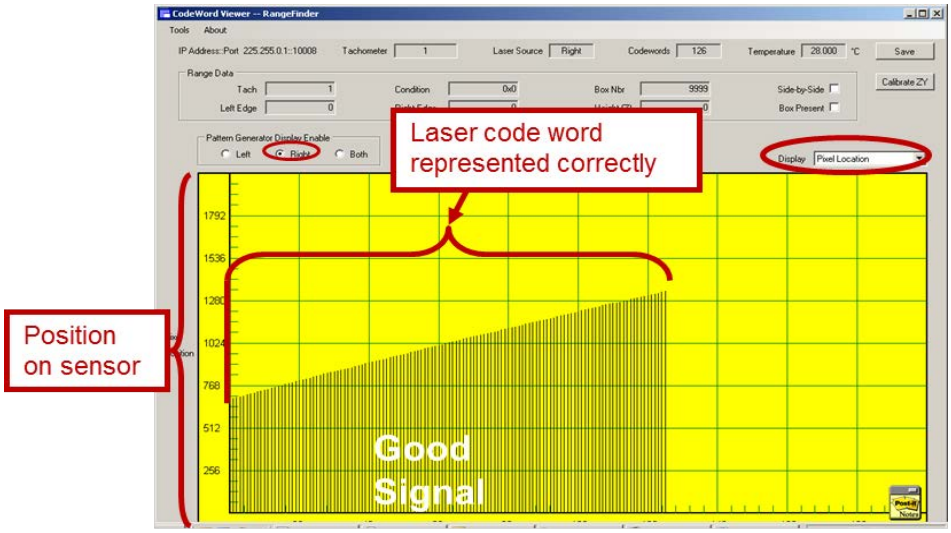
5. Under **RangeFinder Settings**, adjust the signal gain value in the **Offset to Range-Finder Gain Setting** text field until the right and left pattern generator signals are symmetrical in the **RangerOScope** application and gain pattern matches the sample in the image above.



6. Make sure the main part of the signal reaches inside line 192 in the **RangerO-Scope** application program.



7. Open the **CodeWord Viewer** application and view the signal.



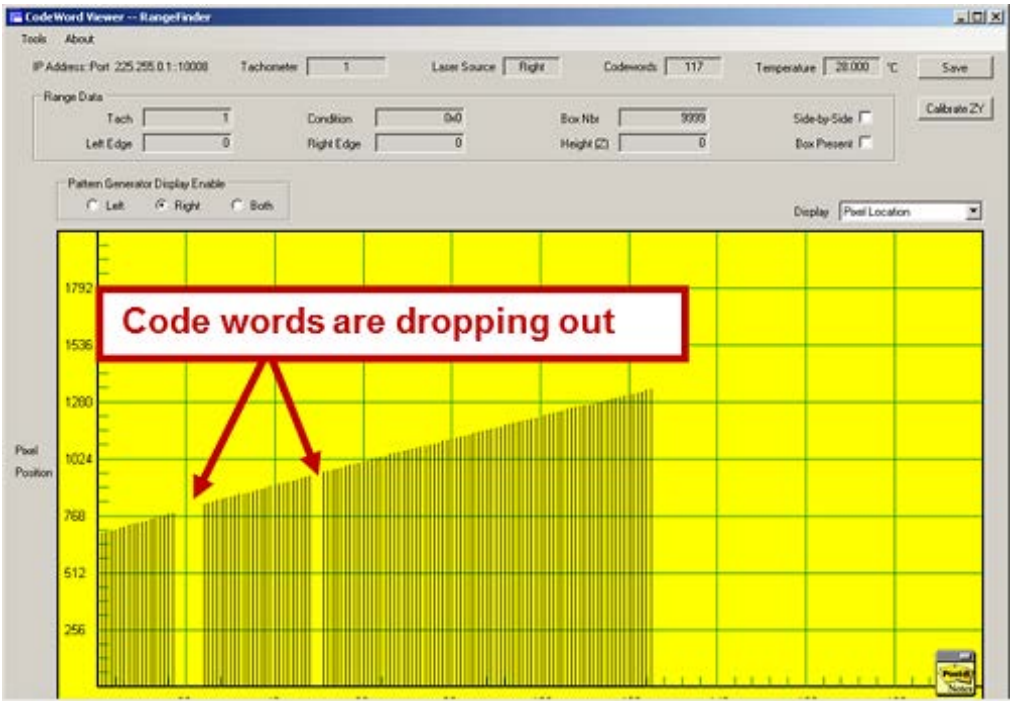
8. Select the **Left** option button under **Pattern Generator Display Enable.**

9. Select **Pixel Location** from the **Display** drop-down list.

10. Watch the CodeWord Viewer screen for a few moments, and make sure the code word signal remains solid, and none of the code words drop in and out.

11. Select the **Right** option button under **Pattern Generator Display Enable,** and make sure the code word signal remains stable.

NOTE: If the gain is set too high or too low some of the code words along the scan line will drop in and out as shown below. Adjust the gain to eliminate the drop-outs.



12. Next, place the white paper on some tall system boxes in the near of the depth of field (DOF) as shown below.

13. Repeat steps 7-11 above.

Possible RangeFinder Signal Degradation Factors

Two factors that can negatively affect the RangeFinder signal are **Laser Power** and **Ambient Light**.

Perform a Laser Power Test

If the Left (or Right) laser signal looks good, but the opposite side laser code words periodically drop out:

1. Select left side signal and note its signal amplitude.

NOTE: The gain may have to be reduced in order to have a good representation of the signal.

2. Select right side laser and confirm that the signal amplitude is relatively equal to the left side signal amplitude.

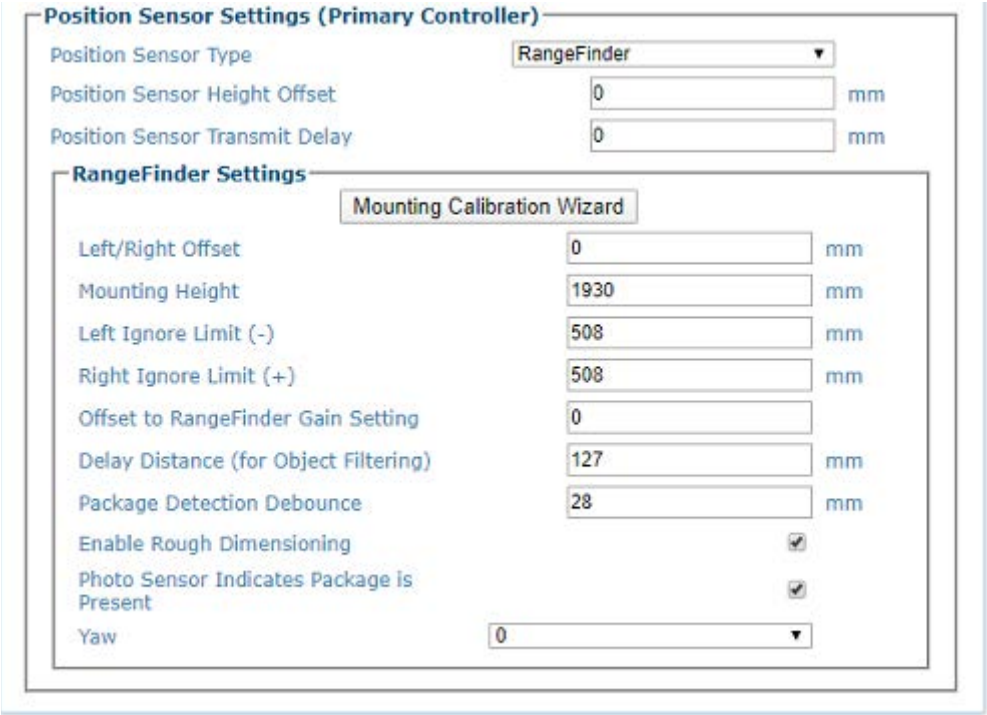
If a noticeable discrepancy is observed, it could indicate a potential problem with the laser diode and the unit could report erroneous height data. Since there are no field repairable items on the RangeFinder the unit should be replaced.

RangeFinder Mounting Calibration Wizard (Static Calibration)

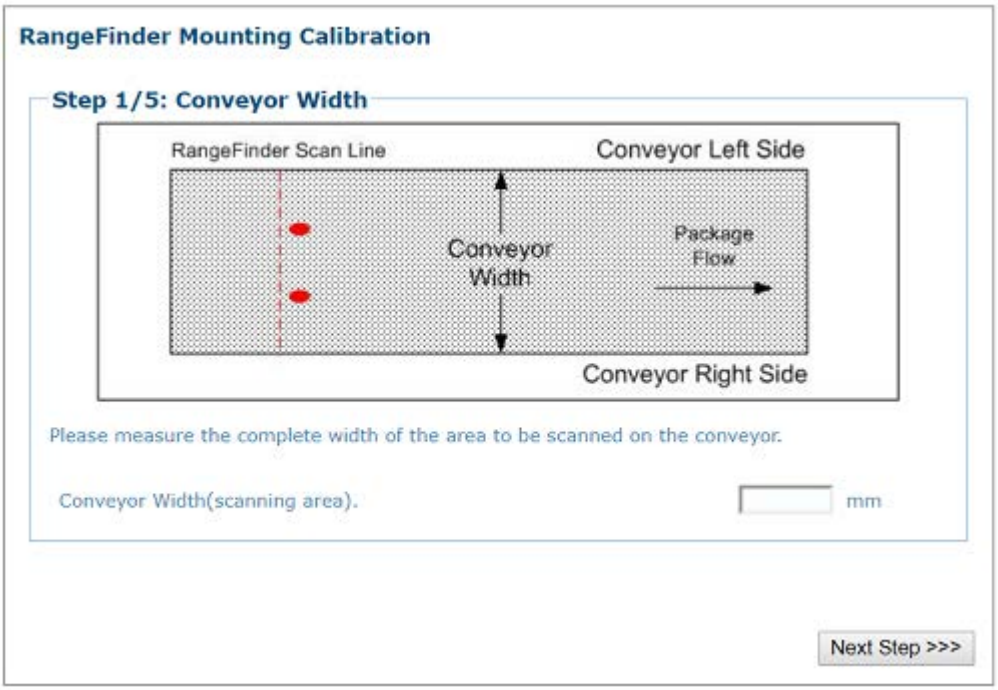
1. In **e-Genius** under **Modify Settings,** navigate to **Global Settings / Operating Mode.** The **Operating Mode** window opens.

2. Under **Position Sensor Settings (Primary Controller)**, select RangeFinder from the **Position Sensor Type** drop-down.

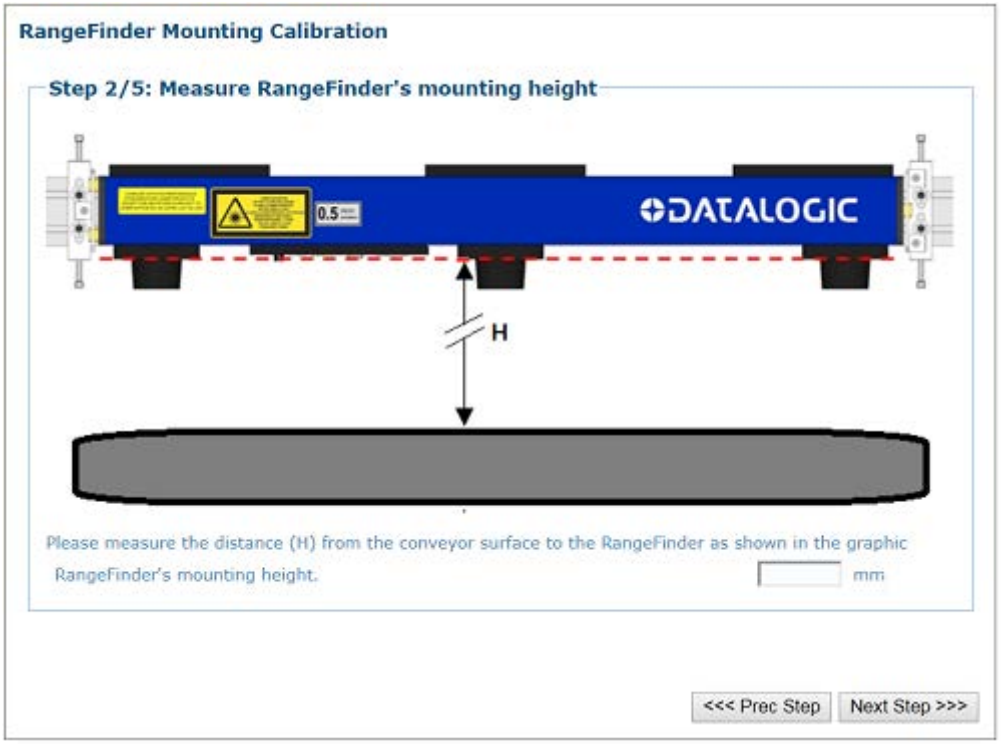
3. The **RangeFinder Settings** options appear.



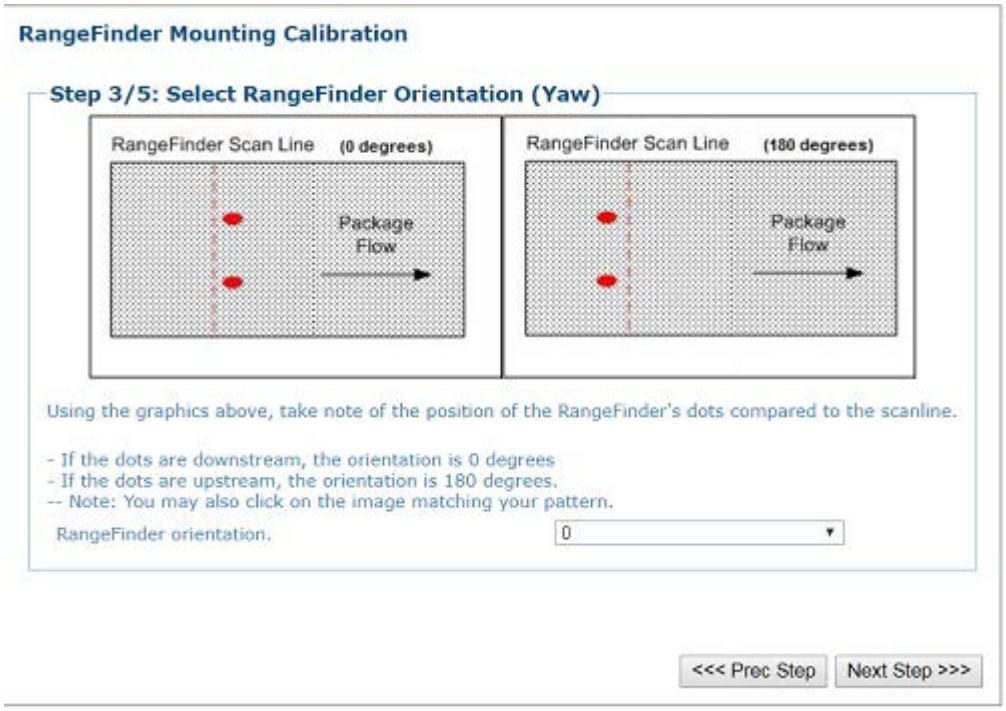
4. Click the **Mounting Calibration Wizard** button, the first step in the Mounting Calibration process appears.



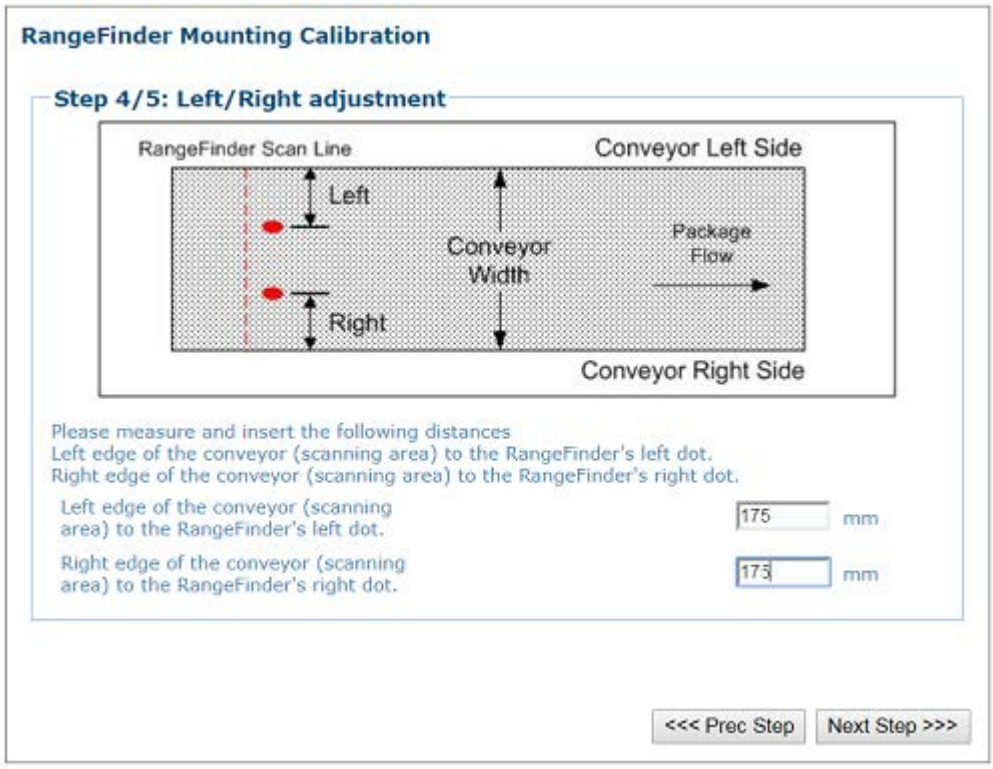
5. Measure the width of the conveyor and enter that value. Click **Next Step >>>** to proceed to Step 2 in the calibration process.



6. Enter the **RangeFinder mounting height.** Measure the distance from the conveyor surface to the Rangefinder and enter that value. Click **Next Step >>>** to proceed to Step 3 in the calibration process.



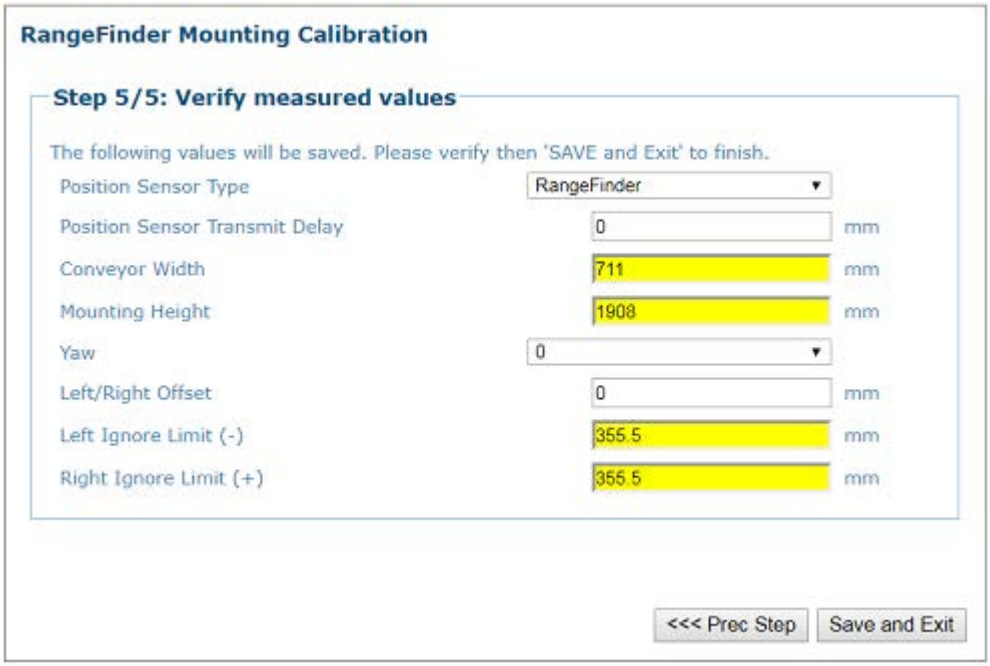
7. Select the **RangeFinder Orientation** or **Yaw** from the drop-down. Click **Next Step >>>** to proceed to Step 4 in the calibration process.



8. Enter the distance from the **Left edge of the conveyor to the Rangefinder's left dot.**

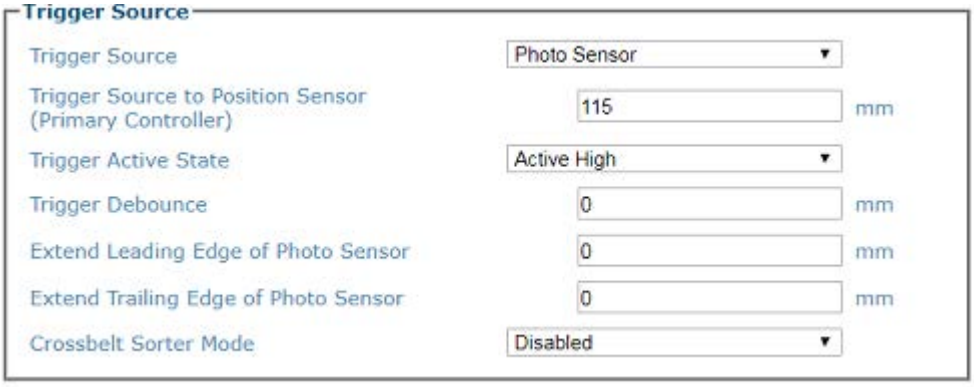
9. Enter the distance from the **Right edge of the conveyor to the Rangefinder's right dot.**

10. Click **Next Step >>>** to proceed to Step 5 in the calibration process.

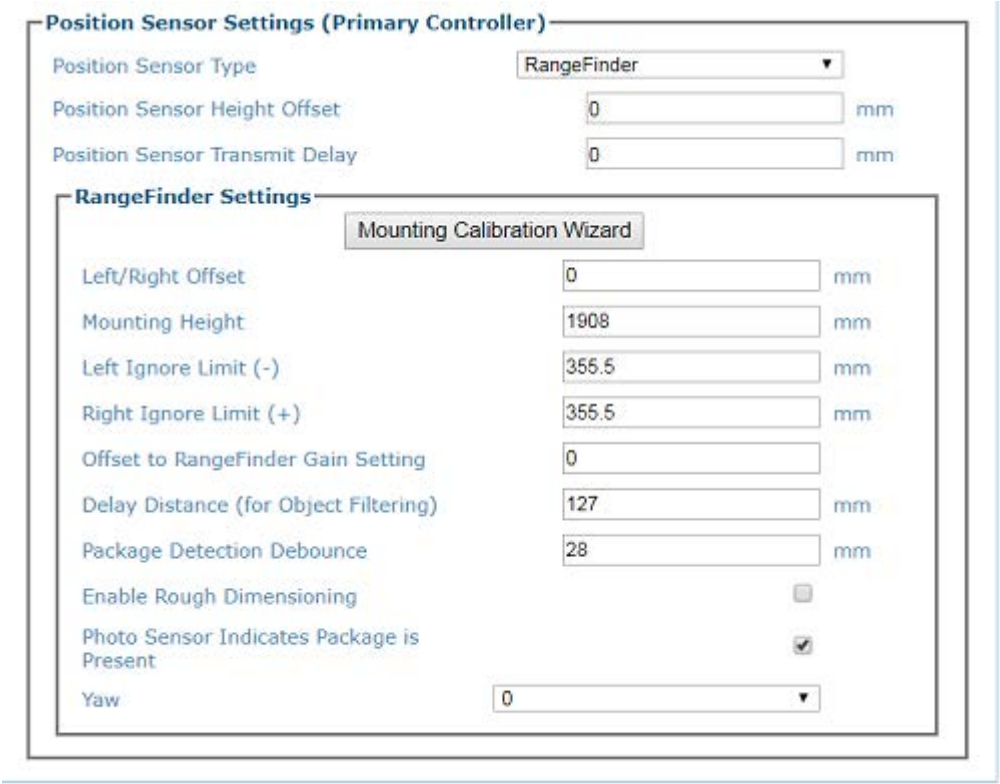


11. Verify the values are correct and click **Save and Exit.**

12. Select the correct **Trigger Source** from the drop-down



13. You will see the values entered during the Mounting Wizard process, appear under **RangeFinder Settings.**



CHAPTER 6
AV7000 FEATURES

In this chapter we explain some of the operating features unique to the AV7000:

- LEDs
- Working with WebSentinel PLUS
- AV7000 Read Charts

LED INDICATORS

AV7000 LEDs

The AV7000 Camera has several LEDs on its back panels.

#	LED	Description
1	I/O	Solid Green – Indicates CBX box connected has the ID+ to GND jumper and this camera is the controller for the tunnel. The Tachometer/Encoder must be connected to this unit.
2	POWER	Solid Blue – Power LED indicating all internal power supplies are at the correct voltage. Can be out if external power is supplied and an internal supply is out of range.

#	LED	Description
3	STATUS	Solid Green– Good status Solid **Yellow** – active warning exists Solid **Red** – active error exists
4	TACH	**Yellow** – Blinks with tachometer/encoder input
5	TRIGGER	**Yellow** – Blinks on when Photoelectric Sensor is triggered
6	HOST NET	Green - Host Network Link at Gbit speed **Red** – Host Network Data activity **NOTE:** With a Gbit link, Green will always be on and Red will blink, looking like it alternates Green to amber. If connected to 100Mbit network, the LED will only blink Red with activity.
7	IMAGE NET	Green - Image Network Link at Gbit speed **Red** – Image Network Data activity **NOTE:** With a Gbit link, Green will always be on and Red will blink, looking like it alternates Green to amber. If connected to 100Mbit network, the LED will only blink Red with activity.
8	SYNC IN	Green - SyncNet Link at 100Mbit speed **Red** – SyncNet Data activity **NOTE:** With a 100Mbit link, Green will always be on and Red will blink, looking like it alternates Green to amber. If connected to 100Mbit network, the LED will only blink Red with activity.
9	SYNC OUT	Green - SyncNet Link at 100Mbit speed **Red** – SyncNet Data activity **NOTE:** With a 100Mbit link, Green will always be on and Red will blink, looking like it alternates Green to amber. If connected to 100Mbit network, the LED will only blink Red with activity.
10	FOCUS NET	Green - Focus Network Link at 100Mbit speed **Red** – Focus Network Data activity **NOTE:** With a 100Mbit link, Green will always be on and Red will blink, looking like it alternates Green to amber. If connected to 100Mbit network, the LED will only blink Red with activity.

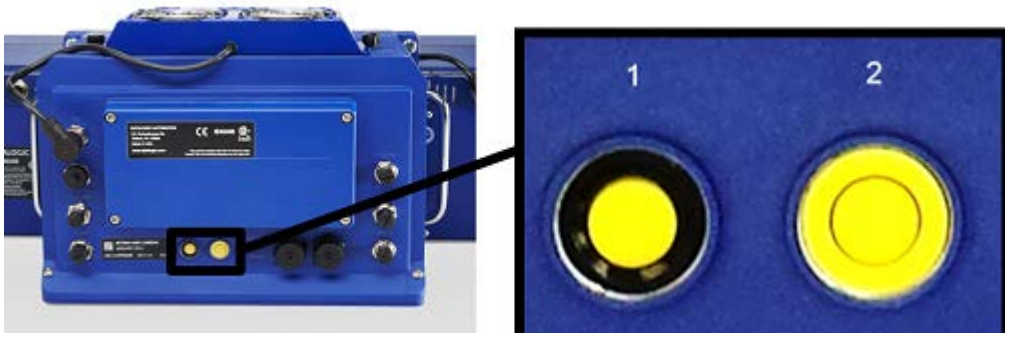
AI7000 Illumination LEDs

The AI7000 Illumination has several LEDs on its back panel.

The indicators have the following meanings:

LED	Description
OVERTEMP	Solid Red – Indicates internal temperature exceeding software or hardware threshold
FAN FAIL	Solid Red – Indicates external cooling fan failure
LED FAIL	Solid Red – Indicates one or more Illuminator LED boards has low current or a failure
POWER	Solid Blue – Indicates illuminator Power ON

CONTROL PANEL BUTTONS



Function	Description
Reset Camera to Factory Defaults	With the unit powered up, hold down buttons 1 and 2 at the same time. The STATUS LED will blink GREEN and then RED to indicate that the unit has been defaulted.

SETTING UP WEBSENTINEL PLUS IN THE AV7000

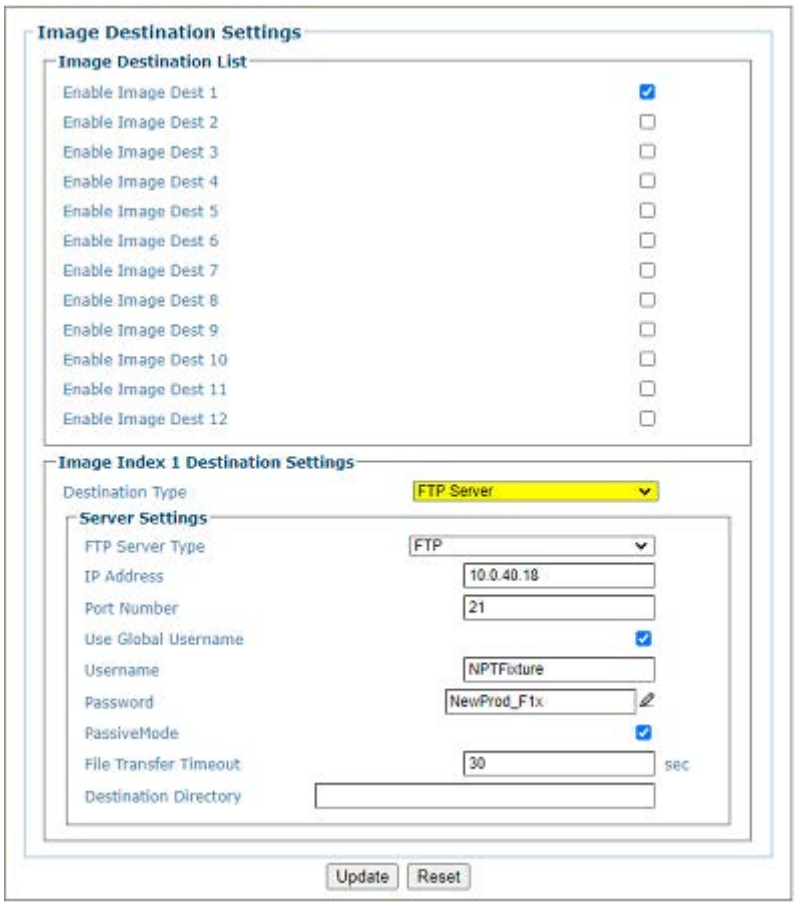
Set the parameters in the order they appear in this documentation.

Update the settings in **e-Genius** as shown in the following procedure:

1. In the menu tree under Modify Settings, navigate to **Global Settings | Image Saving | Destination Settings.** The **Destination Settings** window opens.

ɔ the **Destination Settings** options as shown below.

If your Destination Type is Network File System, be aware of the direction of your slashes. For example, //192.168.1.23/FTP.

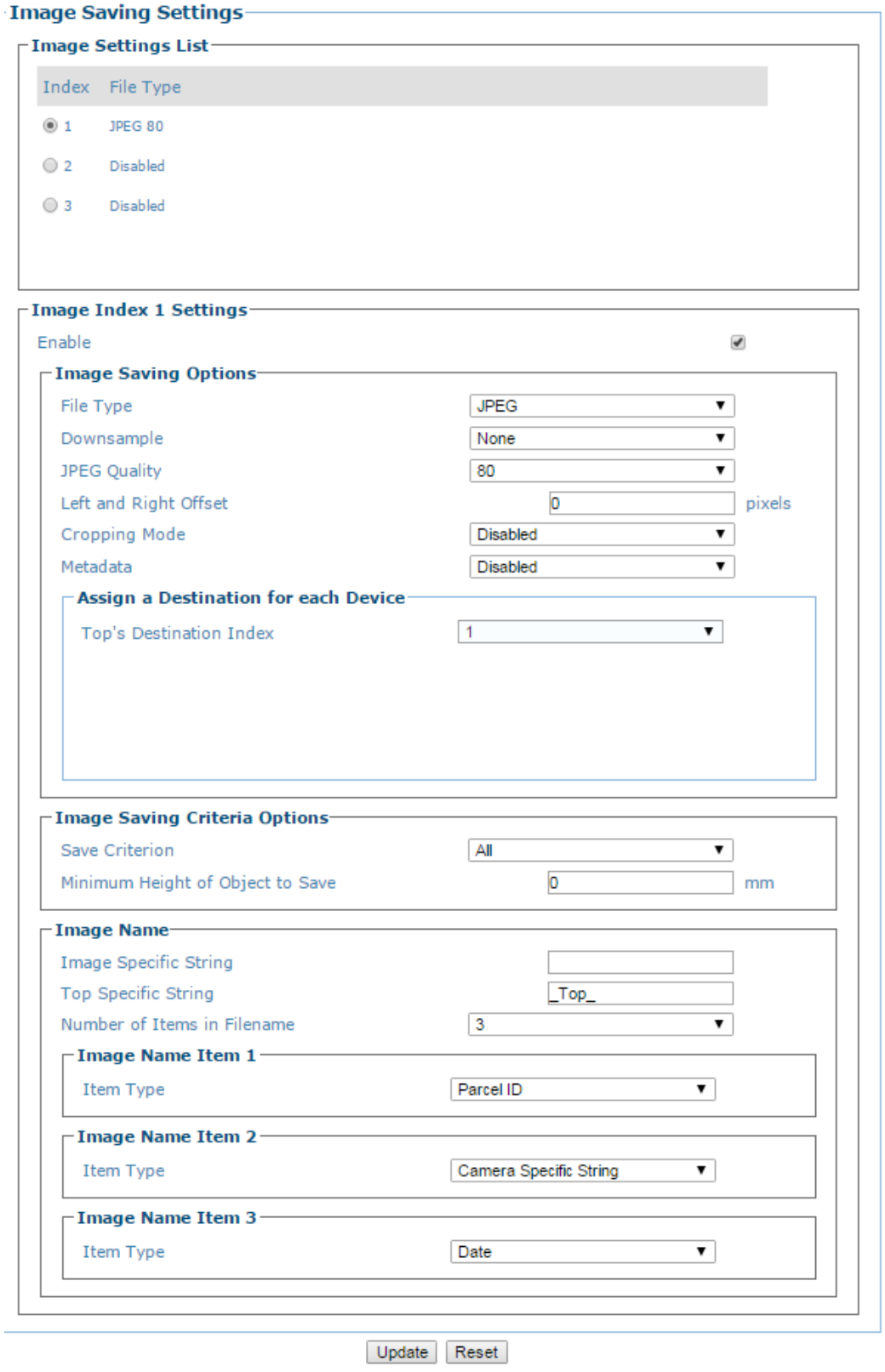


3. Click **Update** to save the changes.

4. In the menu tree under Modify Settings, navigate to **Global Settings | Image Saving | Image Settings.** The Image Settings window opens.

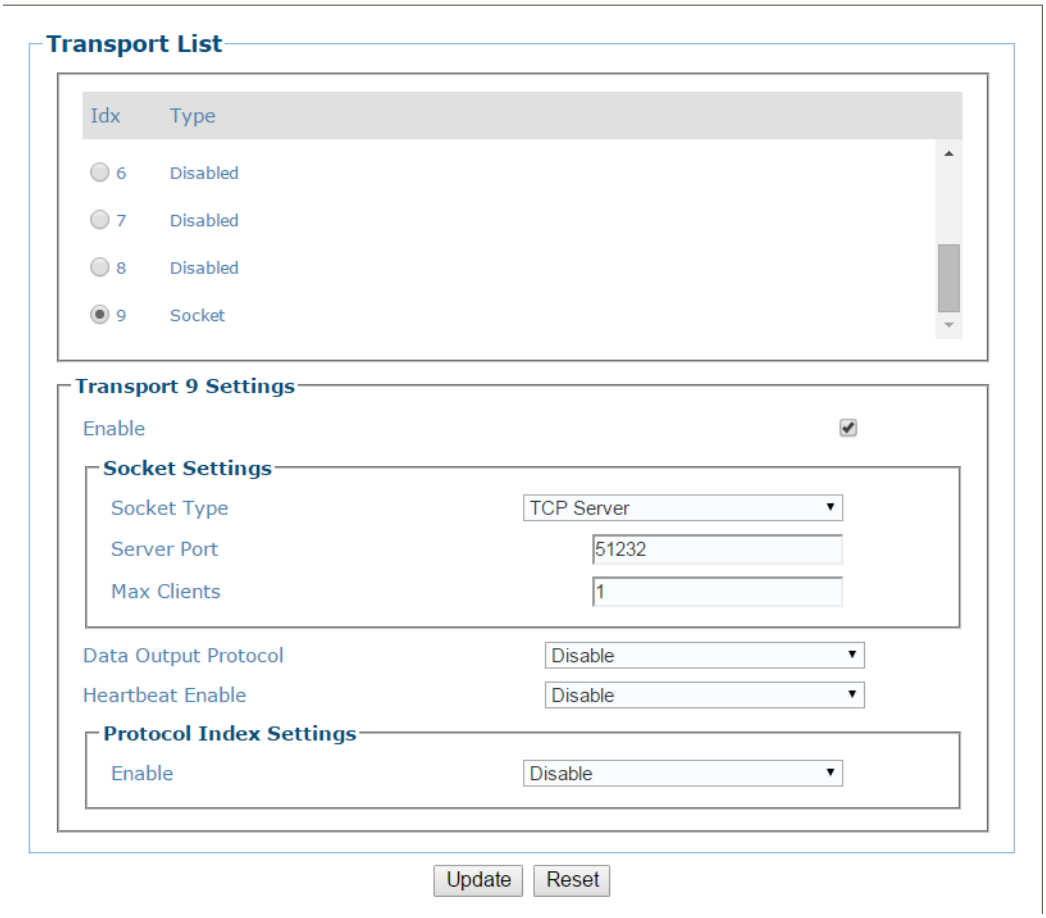
5. Set up the **Image Saving** options as shown below.

6. Click **Update** to save the changes.



7. In the menu tree under **Modify Settings**, navigate to **Global Settings| Communications | Transports.** The **Transports** window opens.

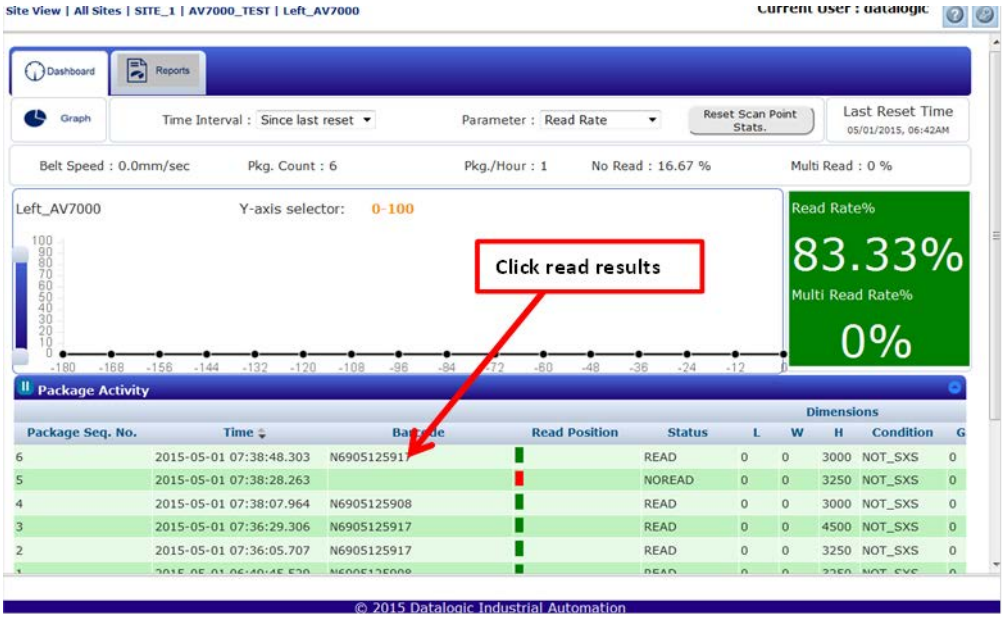
8. Set up the **Transports** options as shown below.



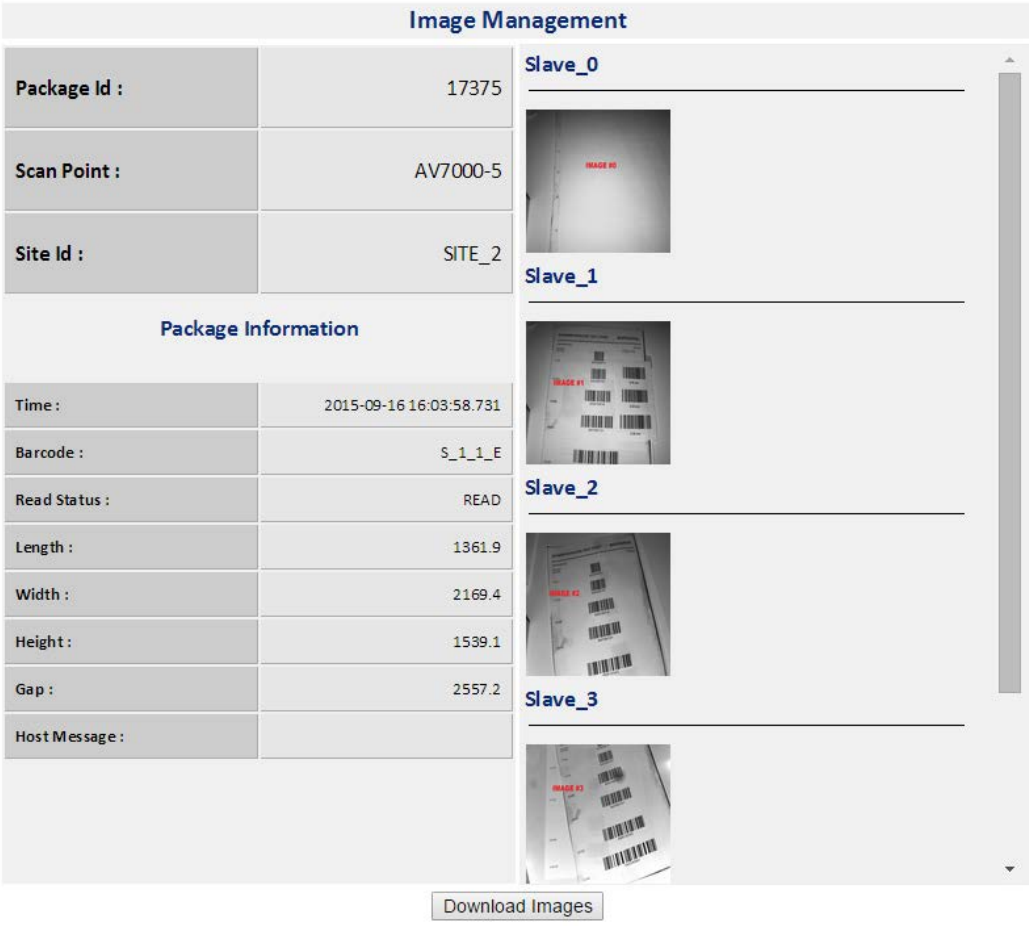
9. Click **Update** to save the changes.

USING WEBSENTINEL TO VIEW AV7000 IMAGES

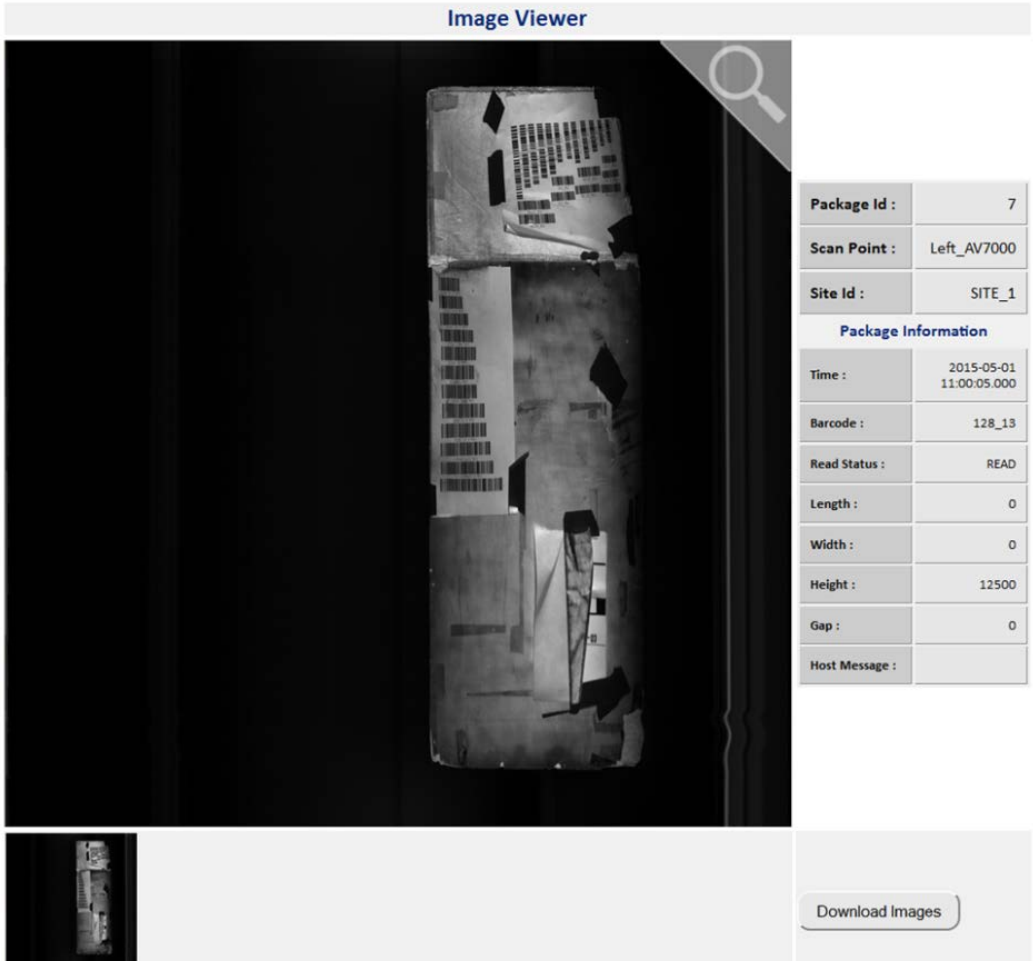
1. Click on the scan point name to view the **Dashboard** window for that device.



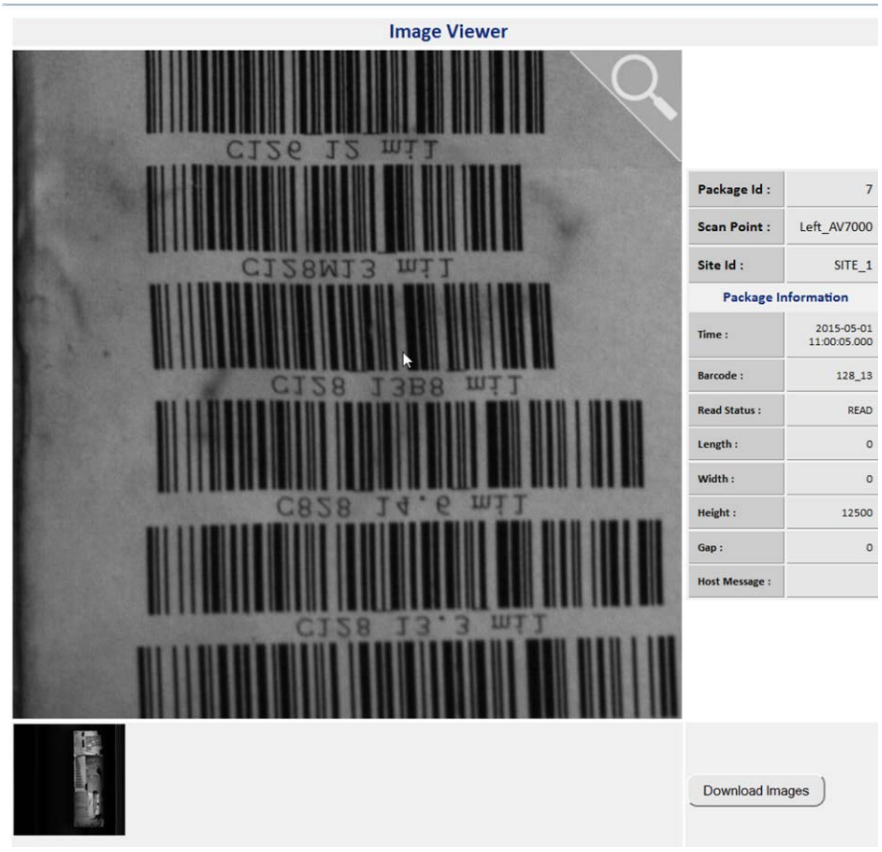
2. Click on the **Package Activity** results to show more information. The **Image Management** window opens.



3. Click on an image to open the **Image Viewer** with additional information.



4. Click and hold the left mouse button over the image to zoom in.



5. To pan the image, click and hold down the left mouse button while moving the cursor around the viewing window.

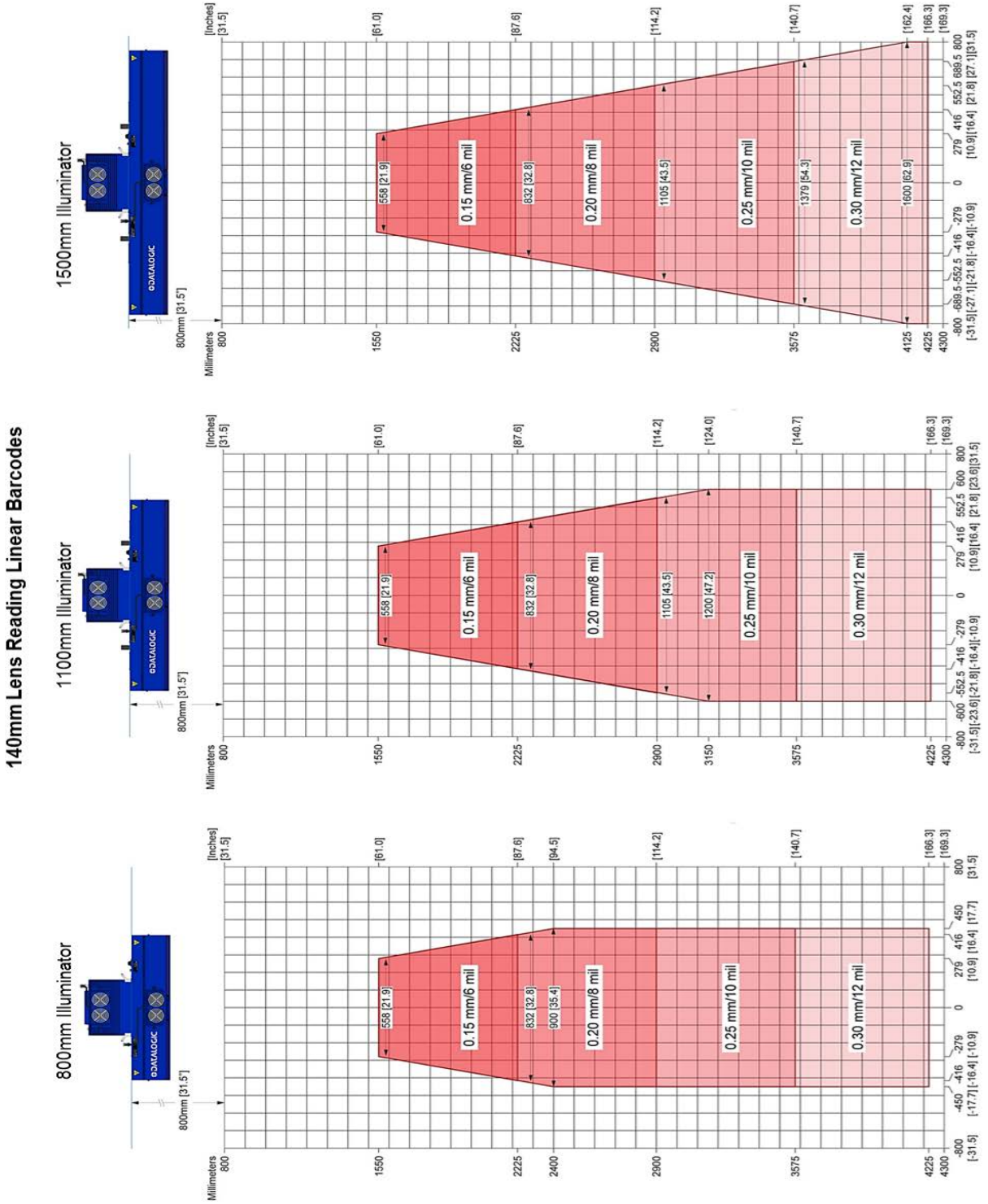
READING DIAGRAMS

How to identify the camera model:

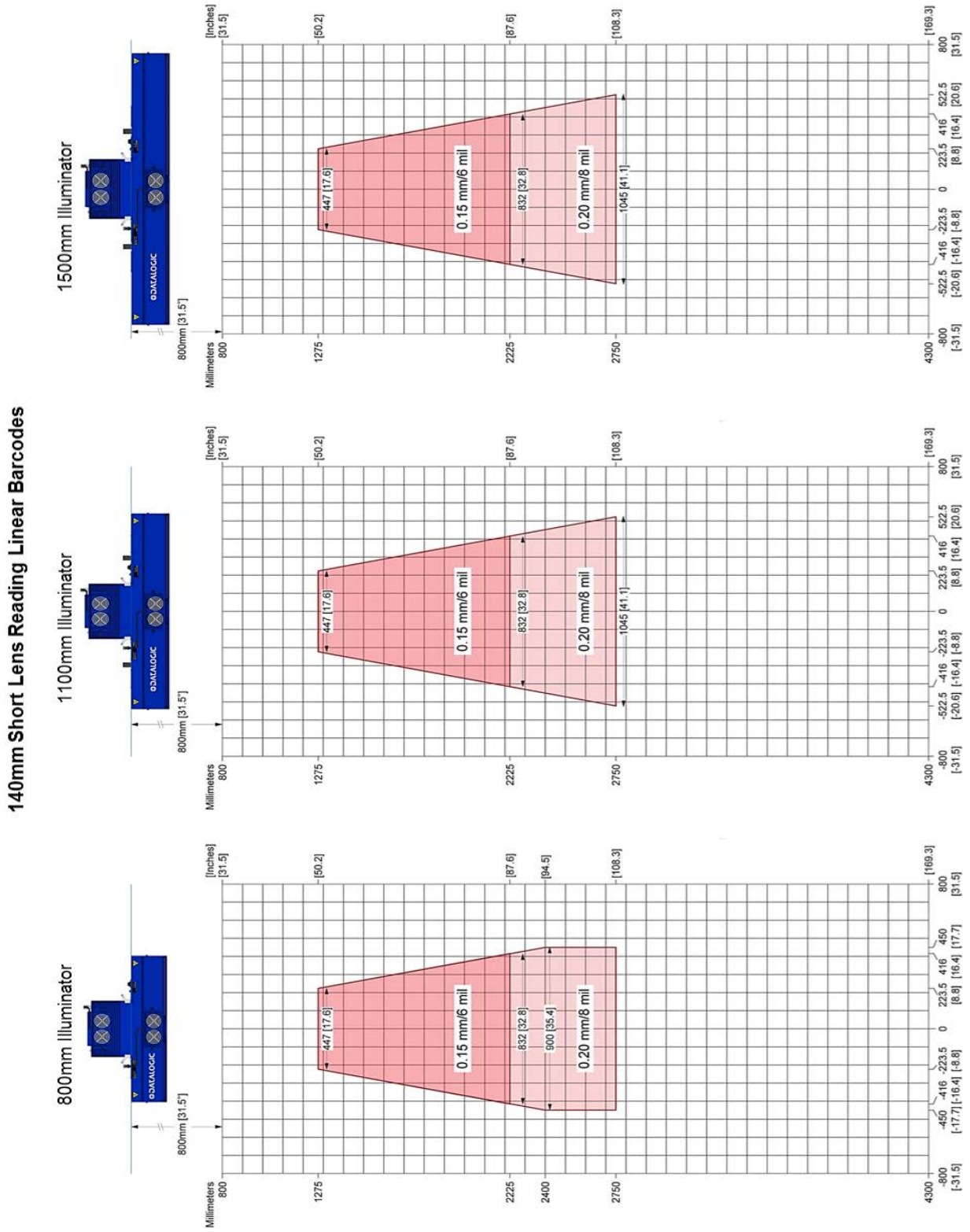
The camera and illumination model numbers are shown on the serial label.

8K SENSOR READING CHARTS

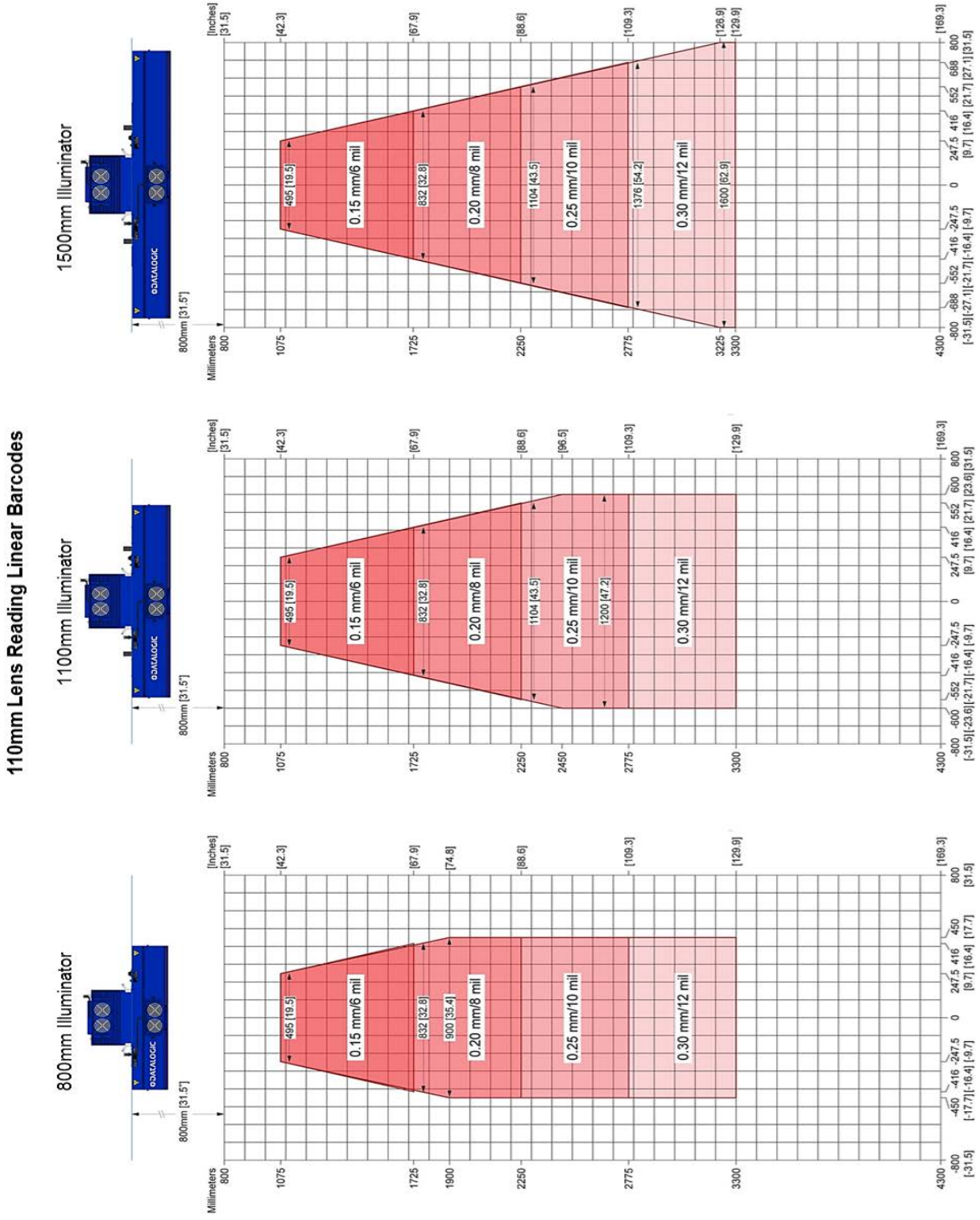
Reading Linear Barcodes



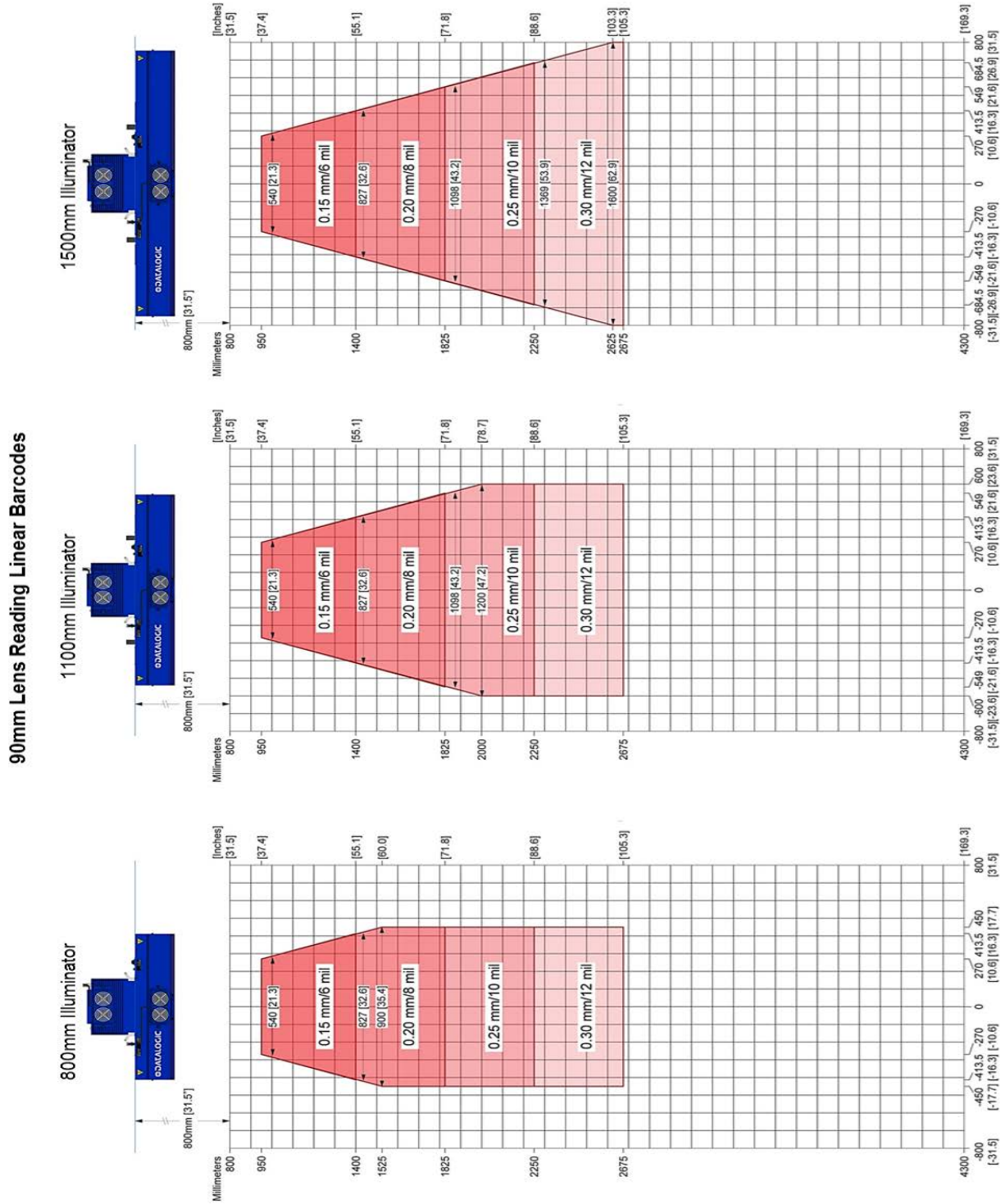
140mm Short Lens Reading Linear Barcodes



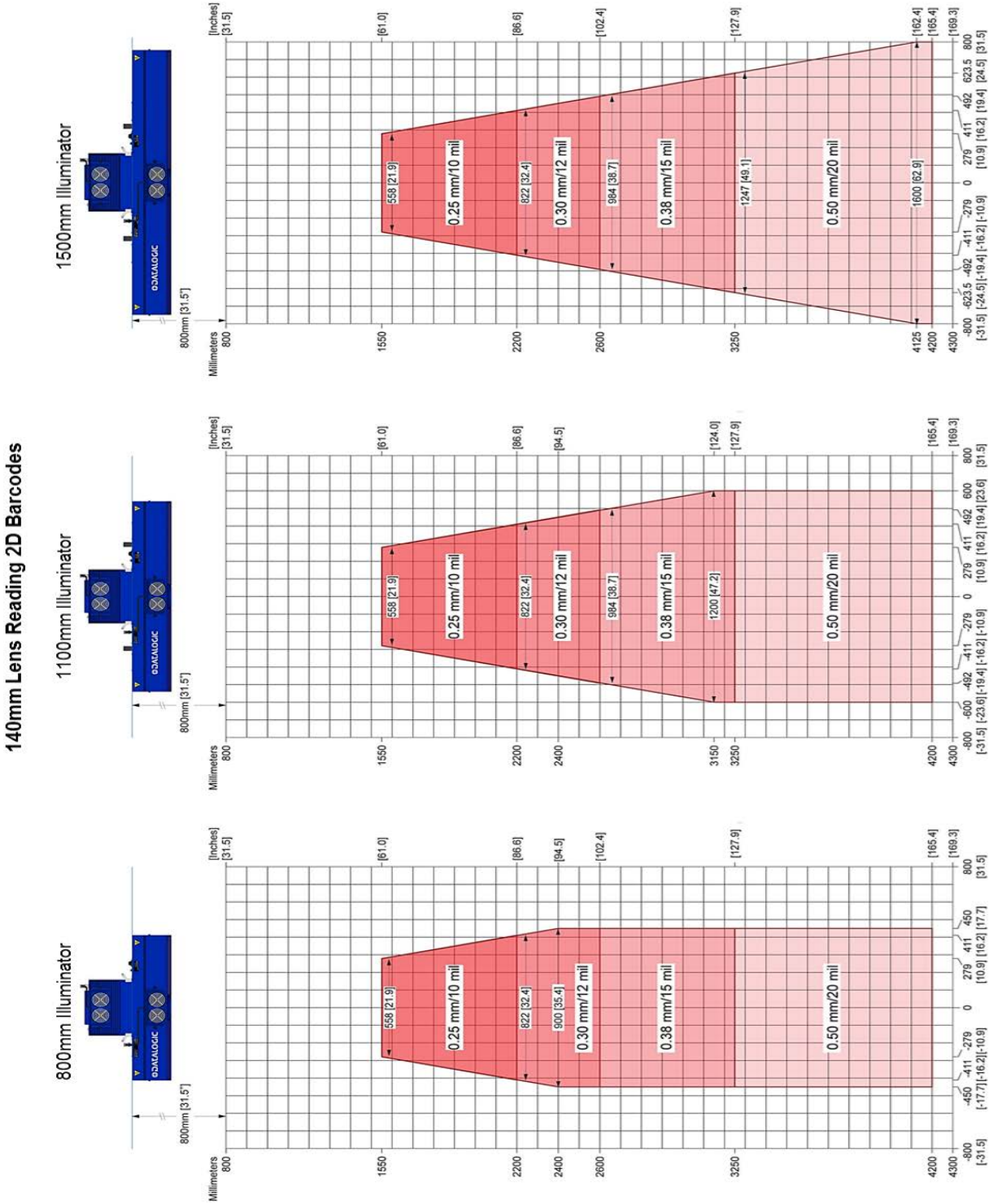
110mm Lens Reading Linear Barcodes



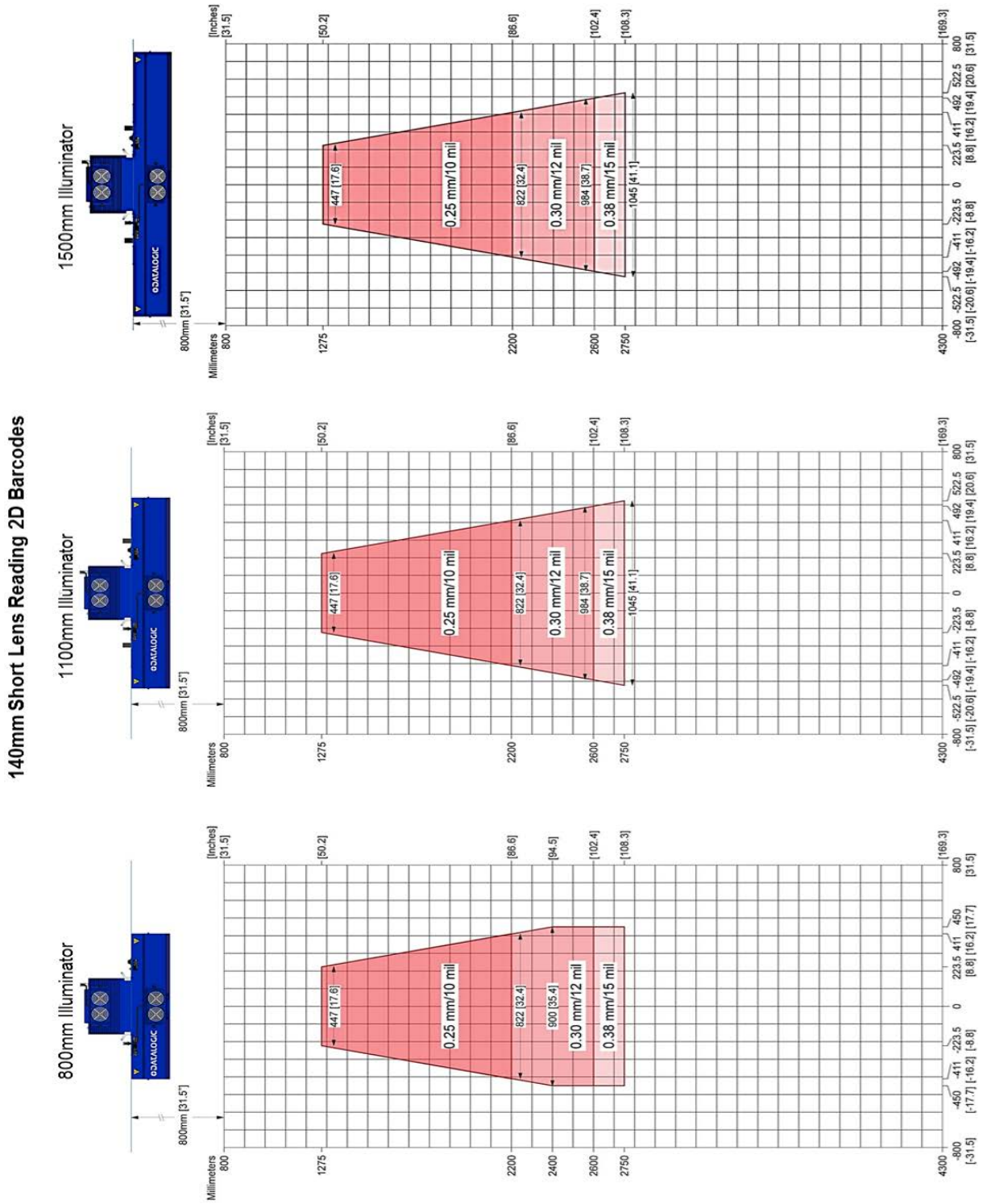
90mm Lens Reading Linear Barcodes



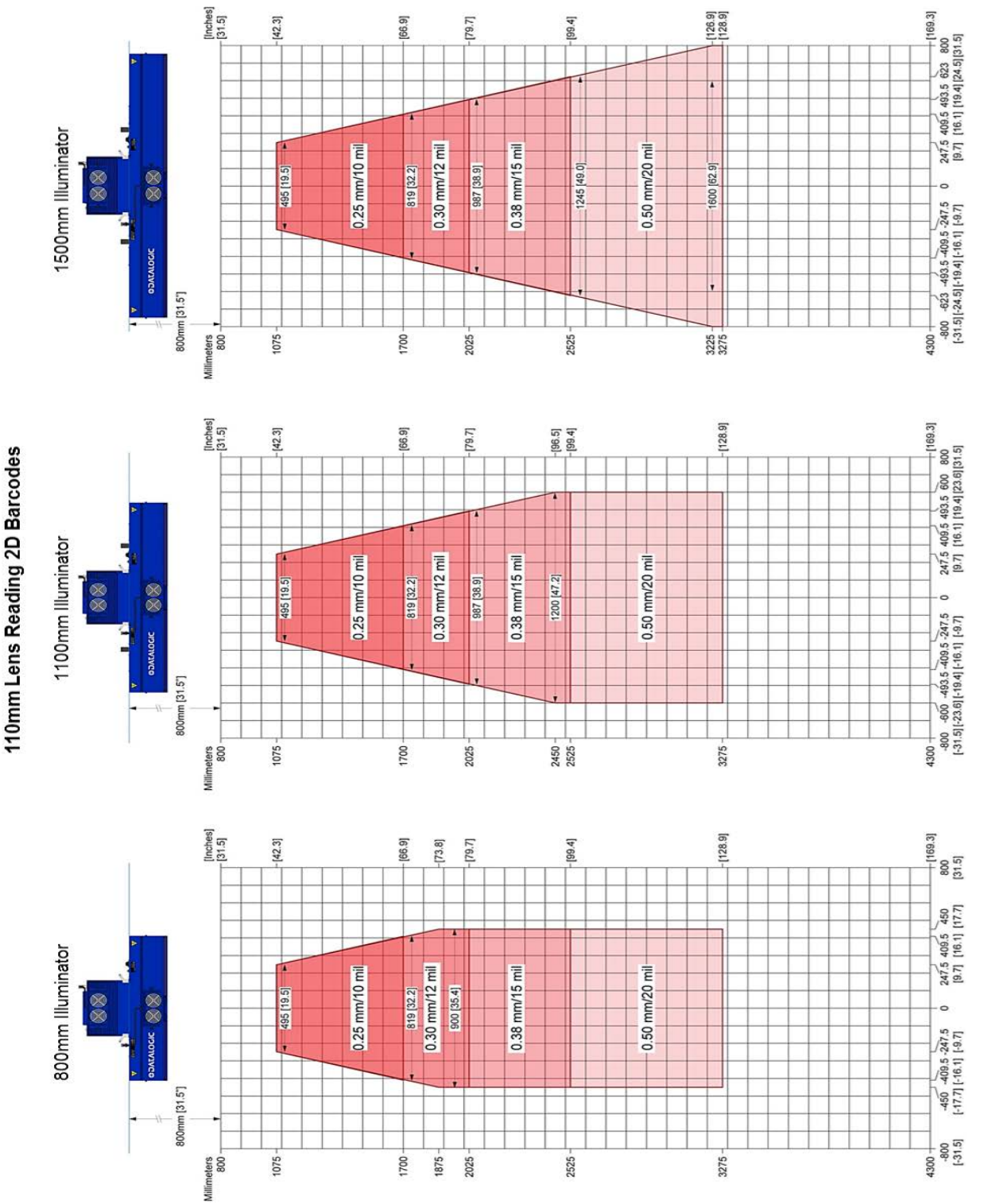
Reading 2D Barcodes



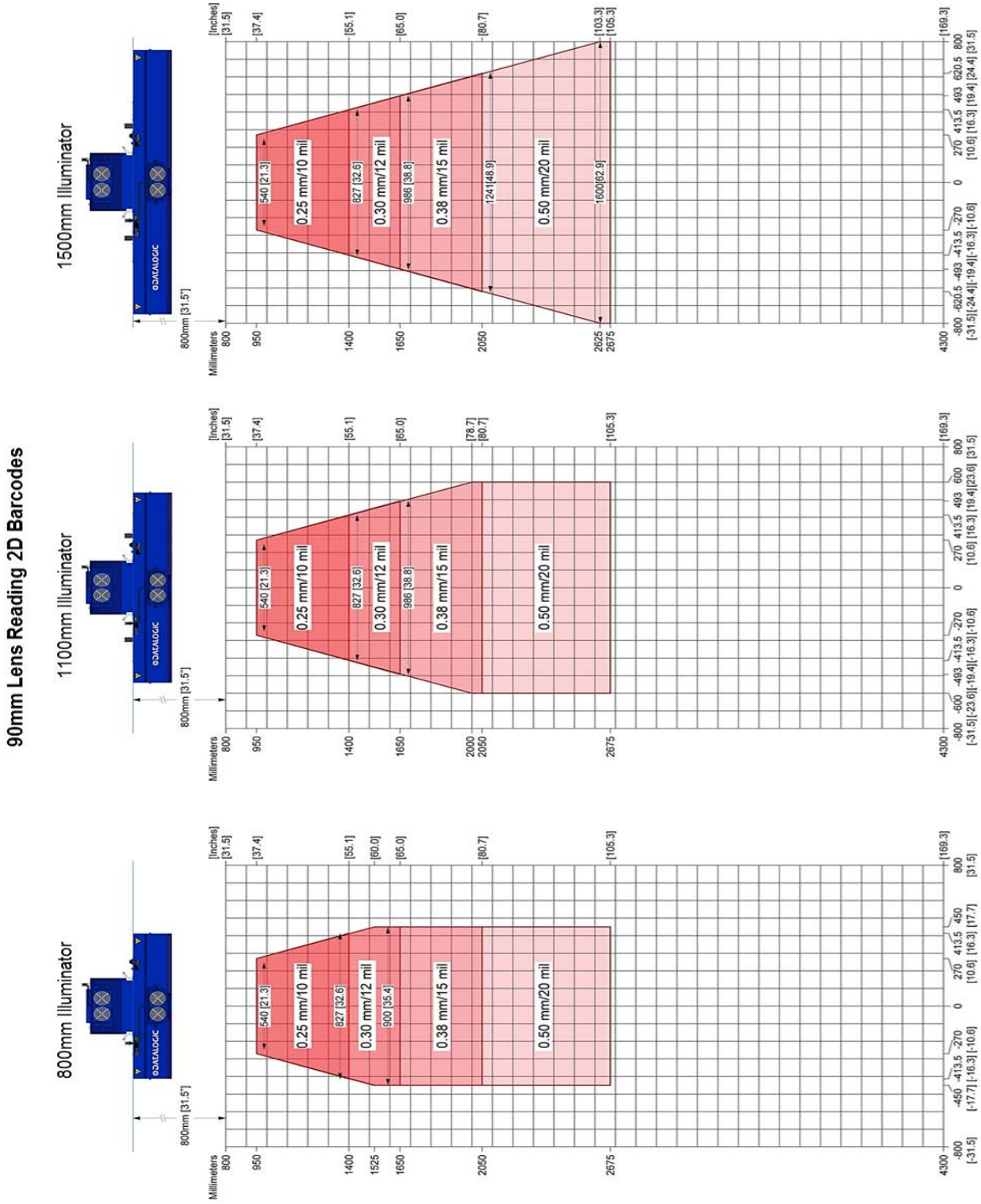
140mm Short Lens Reading 2D Barcodes



110mm Lens Reading 2D Barcodes



90mm Lens Reading 2D Barcodes

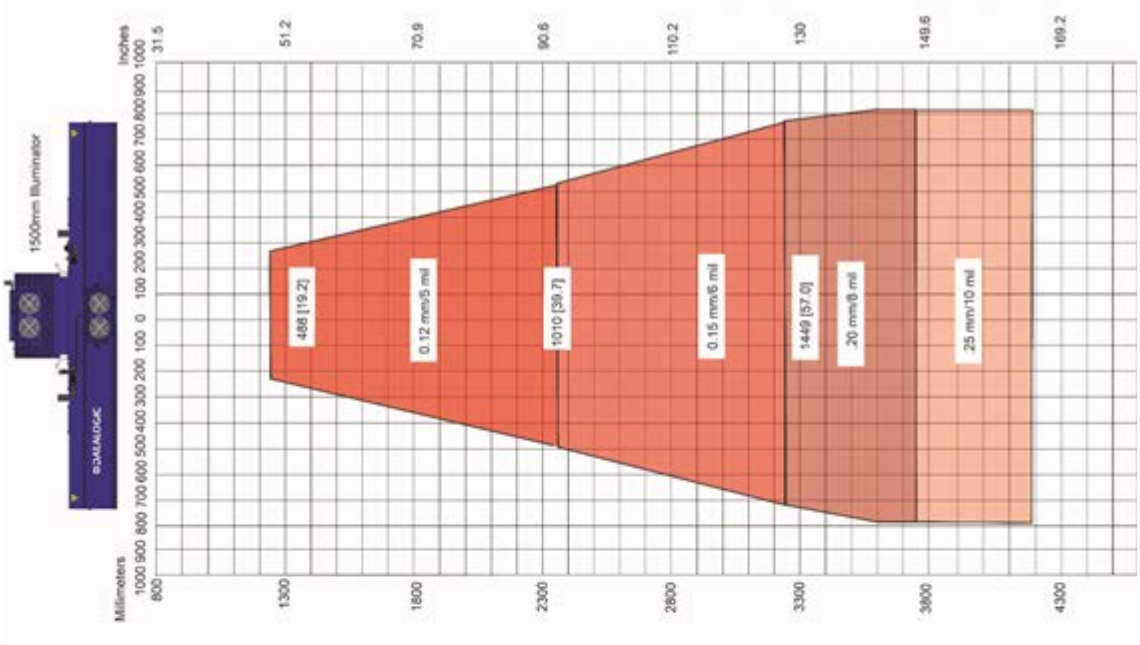


12K SENSOR READING CHARTS

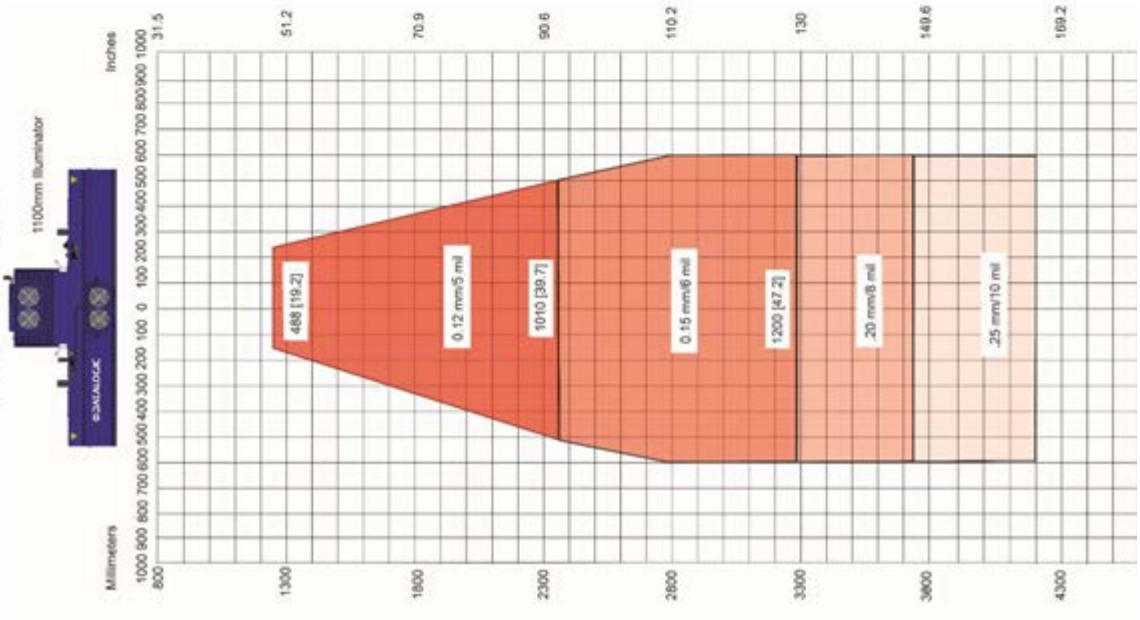
Reading Linear Barcodes

120mm, 12K Linear codes at 1.5 PPM

1500 illumination

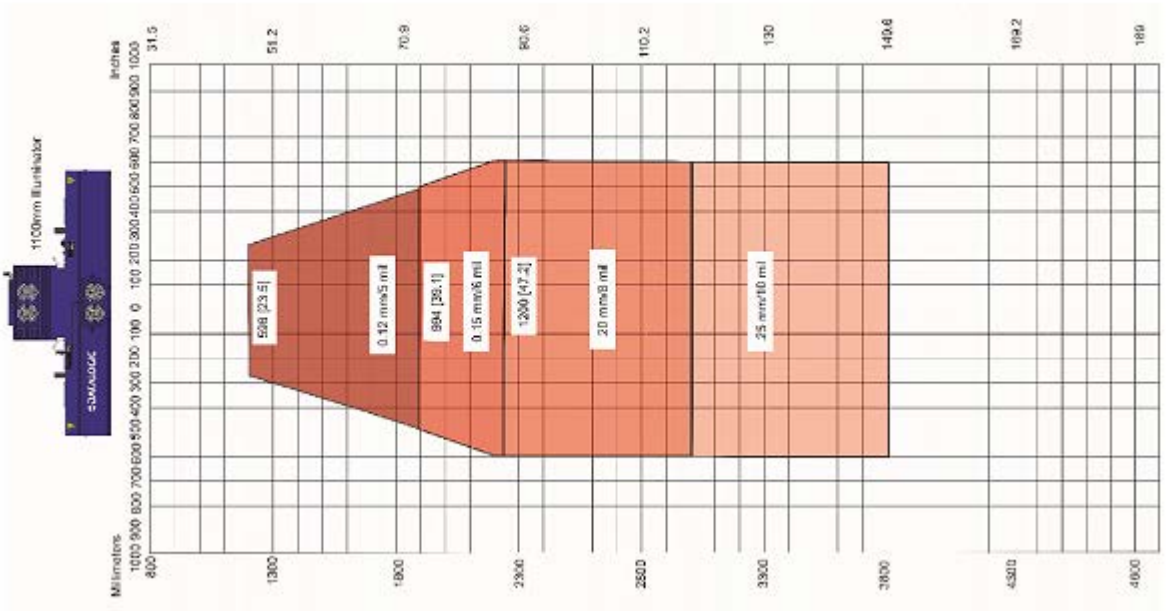


1100 illumination

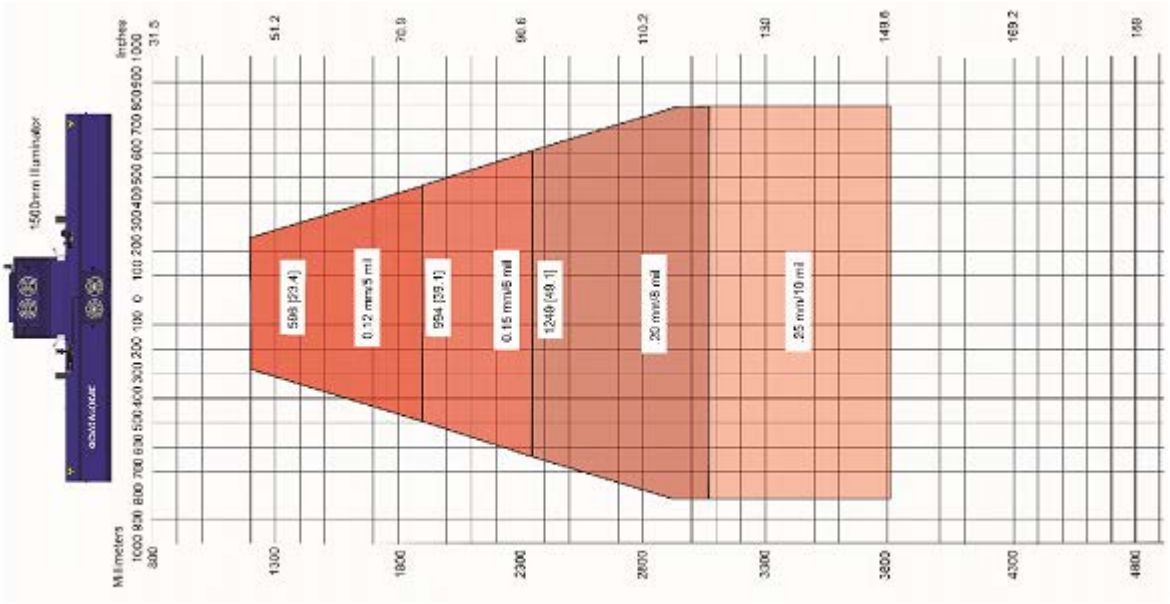


100mm, 12k Linear code at 1.5 PPM

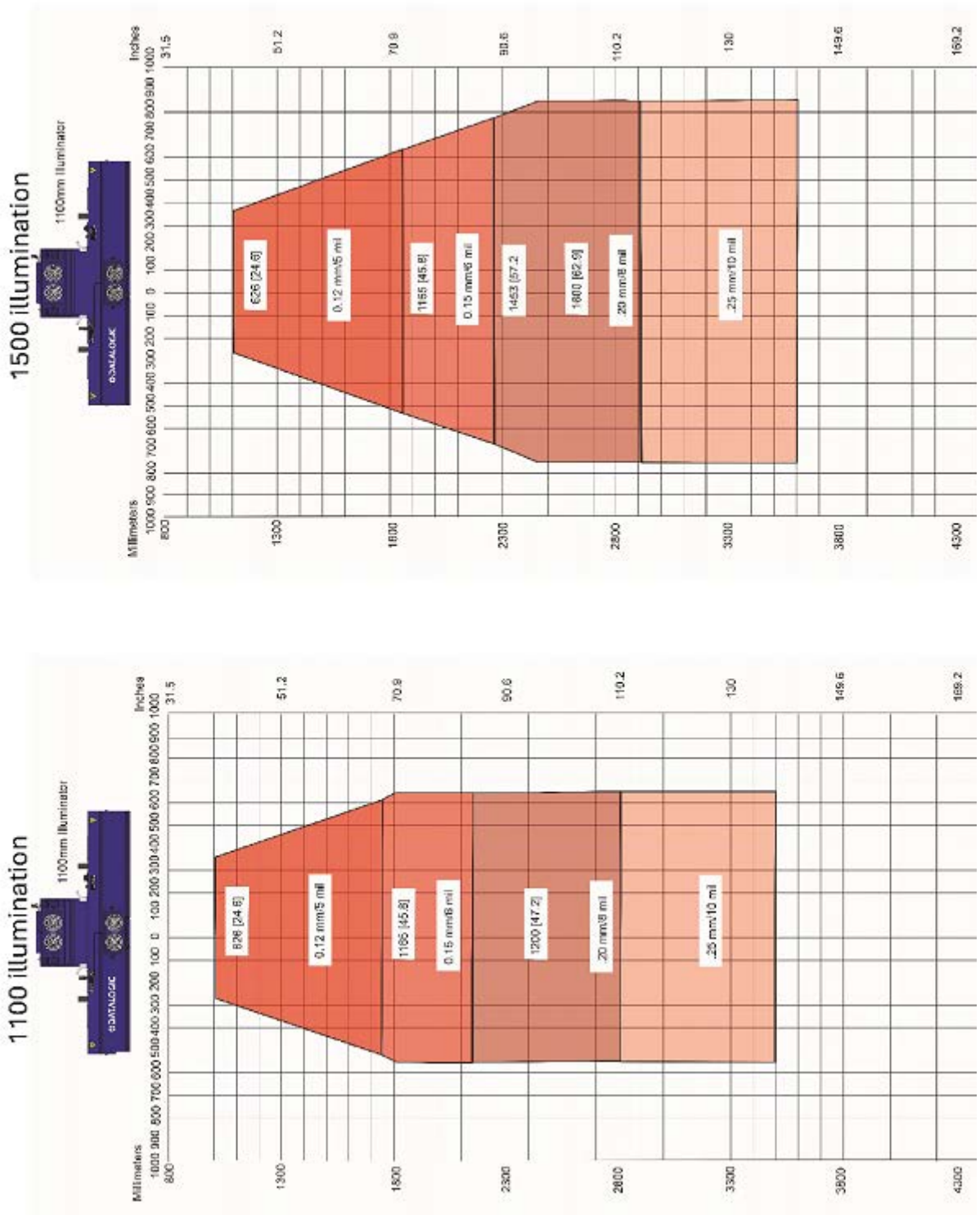
1100 illumination



1500 illumination



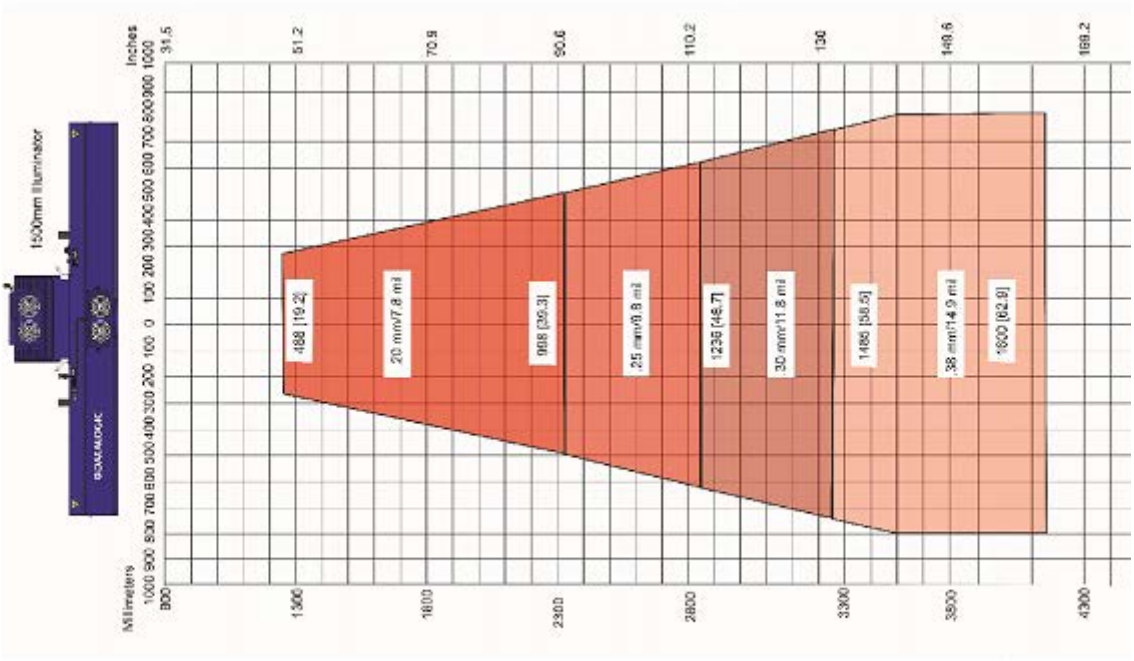
80mm, 12k Linear code at 1.5 PPM



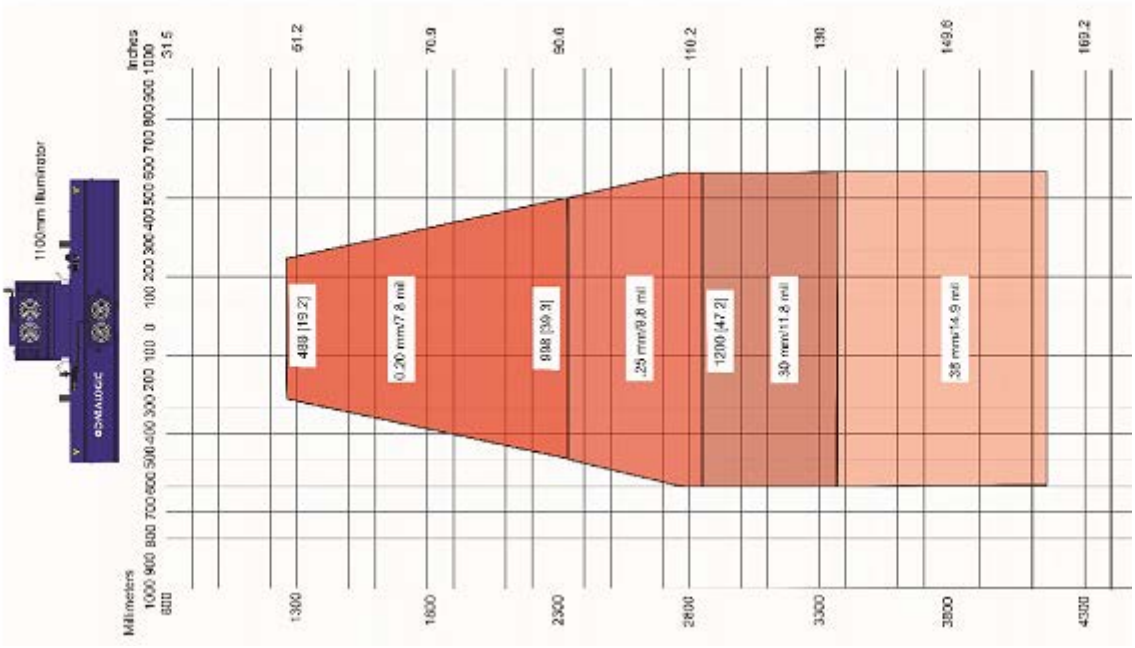
Reading 2D Barcodes

120mm, 12k 2D code at 2.5 PPM

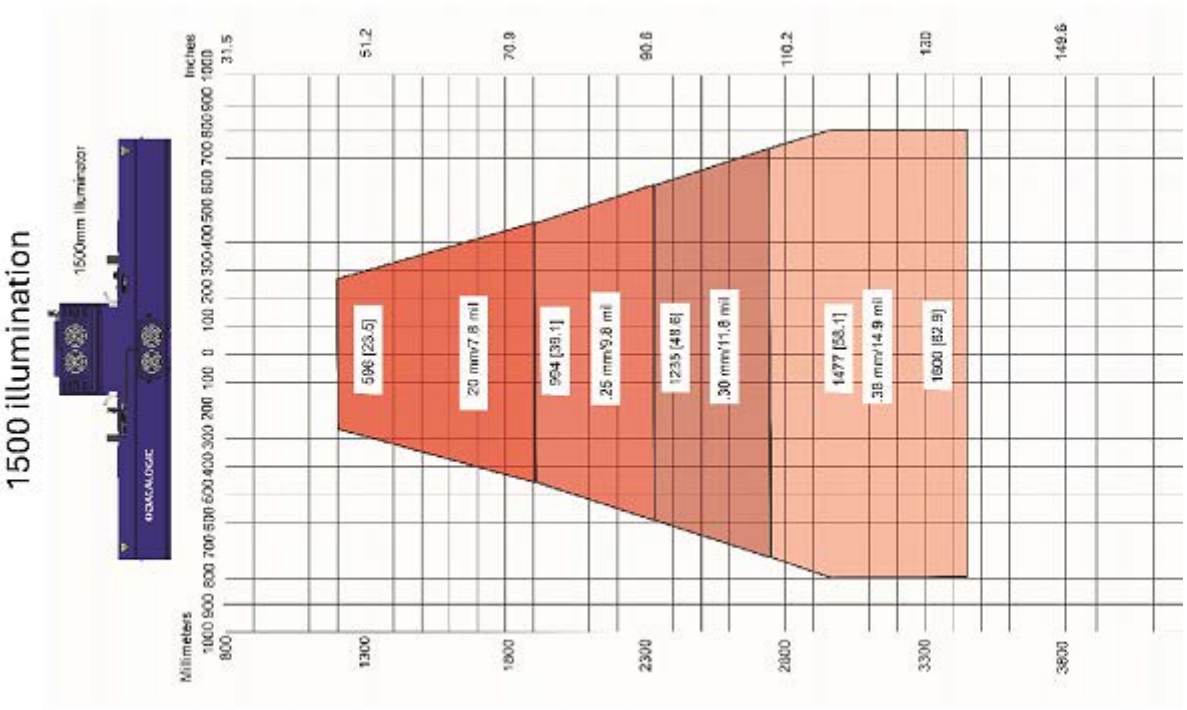
1500 illumination

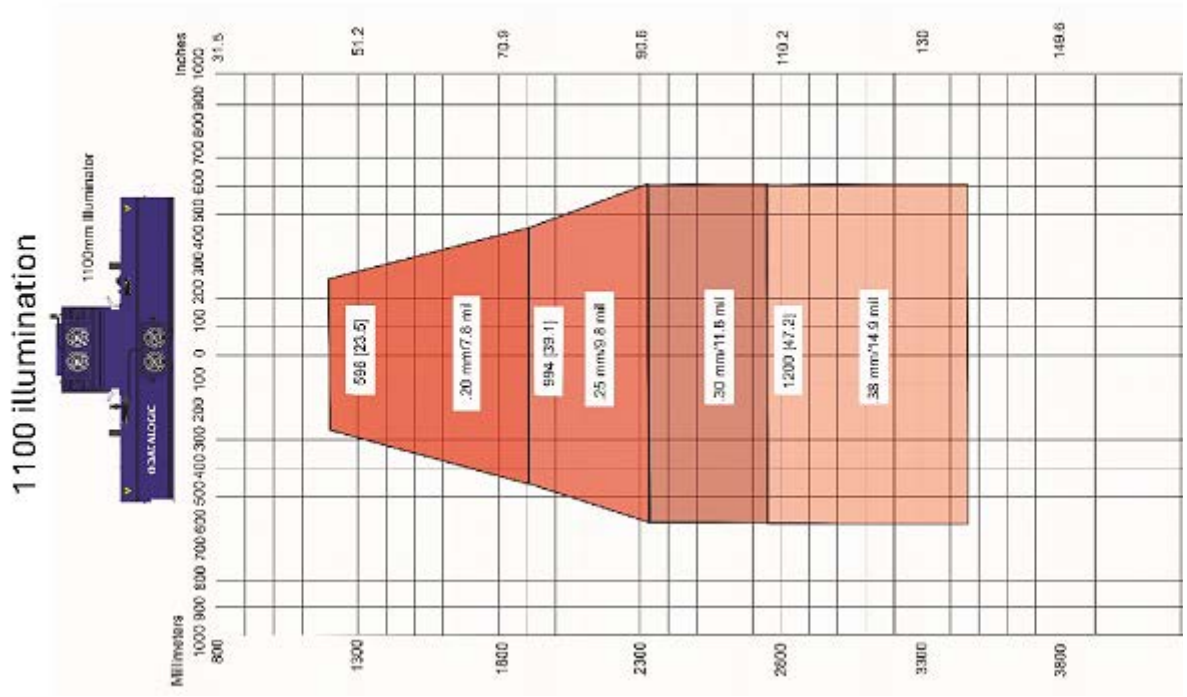


1100 illumination

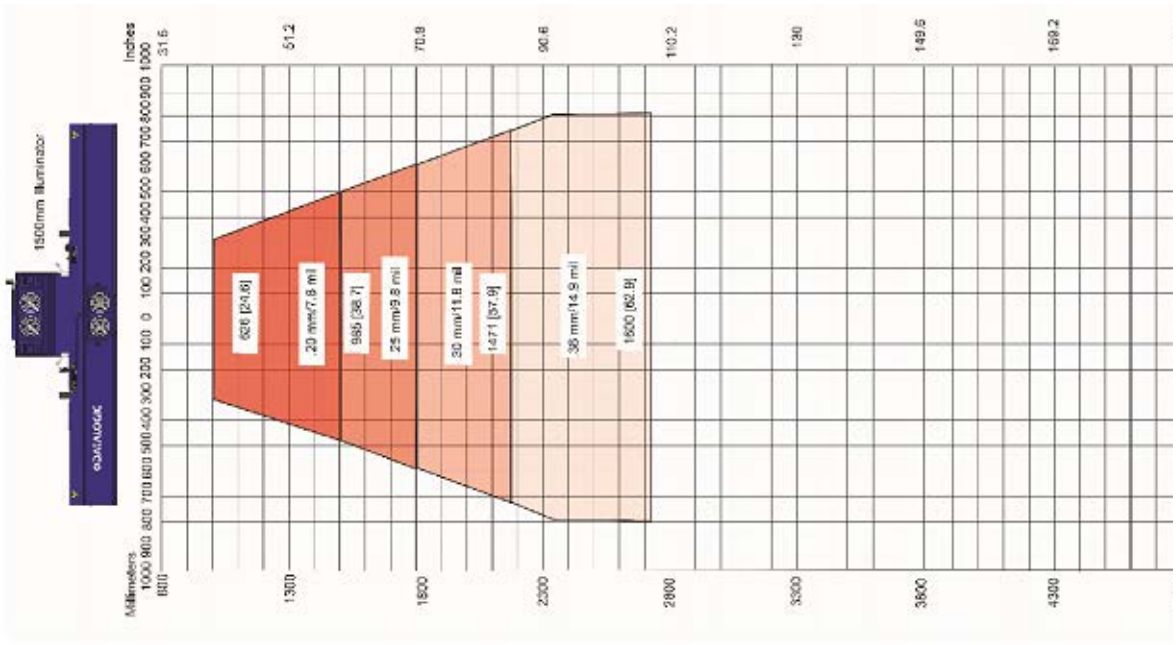


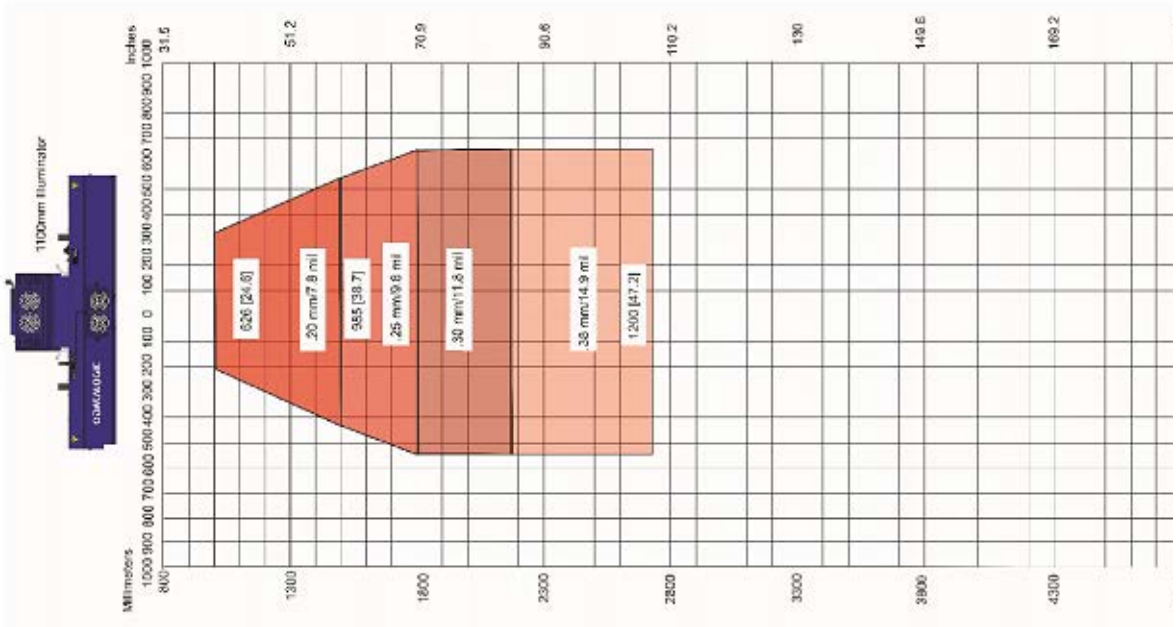
100mm, 12k 2D code at 2.5 PPM





80mm, 12k 2D code at 2.5 PPM





CHAPTER 7
MAINTENANCE

OVERVIEW

This chapter provides instructions for maintaining optimal performance and life for your AV7000 cameras. It provides specific information on:

- Maintenance Procedures
- Exterior Cleaning
- Mounting Hardware Checks
- Wiring Connection Checks

Item	Description
Soft-bristle brush	For cleaning the unit's exterior
Clean, soft cloths	For cleaning the unit's exterior
Cleaning solutions	Mild detergent solution for cleaning the unit's exterior. 70% denatured alcohol, 30% de-ionized water solution for cleaning
Soft cotton swabs or	Use to clean illumination exit window

NOTE: Due to the complex and application-specific nature of these installations, AV7000 camera systems must be setup and serviced by authorized technicians trained by Datalogic.

The maintenance procedures in this chapter may be performed by an end user technician. Training is recommended if the end user intends to do more than the maintenance procedures provided in this chapter.

THERE ARE NO USER SERVICEABLE PARTS WITHIN THE AV7000.

DO NOT OPEN THE UNIT. OPENING THE AV7000 MAY VOID ITS WARRANTY.

CAUTION: Proceeding with any setup, calibration, or service procedures without proper training may void the warranty.

For further information on training, contact us through our website at www.datalogic.com.

RECOMMENDED MAINTENANCE FREQUENCY

The AV7000 Camera Barcode Reading System is designed for industrial environments. The recommended frequency for performing these maintenance tasks will depend on the application's environment. In general, these procedures are recommended only if it is noticed that the environment is dirty enough that deposits are appearing on the equipment or when performance is degraded by accumulation of dust or dirt on the exit windows or deflection mirrors. By monitoring normal operations and performing weekly visual checks, you can establish a maintenance schedule that fits your application.

MAINTENANCE TASKS

Perform the maintenance tasks on an "as needed" basis to assure proper operation of the camera.

Task schedule frequency depends upon the application environment conditions. Harsh environments that expose the equipment to more heat, dust, and dirt will require these procedures be performed more frequently.

It only requires a few minutes to complete each maintenance task.

Exterior Cleaning

NOTE: Do not use any chemical on the barcode reader that is unsafe for plastics, such as benzene, acetone, or similar products. Before performing this maintenance task, be sure to shut down the unit.

The exterior cleaning procedure may be performed without removing the barcode reader from the mounting structure.

1. Switch off the conveyor.
2. Switch off the camera system by disconnecting the power source.
3. Clean the exterior (except the windows) with a clean, soft-bristle brush. Be sure not to brush any dust, dirt, or debris onto the windows.
4. Carefully remove any dirt or debris in or around the connector panel and cooling fans. If necessary, clean under the fans by removing them from the camera and illumination. Unscrew the knurled knobs at the sides of the fan and lift it free.
5. Wipe the exterior with a clean, soft cloth dampened slightly with a mild detergent solution.

Cleaning the Illumination and Camera Window

NOTE: Shut down the camera system before performing this maintenance task. Do not stare into the camera's window at the LED light. Avoid direct eye exposure. The LED light level does not constitute a health hazard, however staring at the LED light for prolonged periods could result in eye damage.

Never apply cleaning solution directly to the camera window. Always apply the solution to a cloth, and then the cloth to the window. Do not use any chemical on the camera that is unsafe for plastics, such as benzene, acetone, or similar products.

This procedure is recommended only if it is noticed that the environment is dirty enough that deposits are appearing on the deflection mirrors. The window cleaning procedure should be performed without removing the camera from the mounting structure.

1. Switch off the conveyor.
2. Switch off the camera system.
3. Follow the exterior cleaning procedure before cleaning the window.
4. Check the window surface for any dust, dirt, or smudges. If the window needs to be cleaned, proceed to Step 5.
5. Make a solution of seven parts denatured alcohol and three parts water. (Many over-the-counter solutions will leave deposits/smudges that can affect performance.)
6. Apply the cleaning solution to a lint-free cotton cloth.
7. Apply the cloth with cleaning solution to the camera and illumination window.
8. Remove any streaks or remaining moisture from the window with a dry, soft, lint-free cloth or lens paper.
9. Verify camera operation.

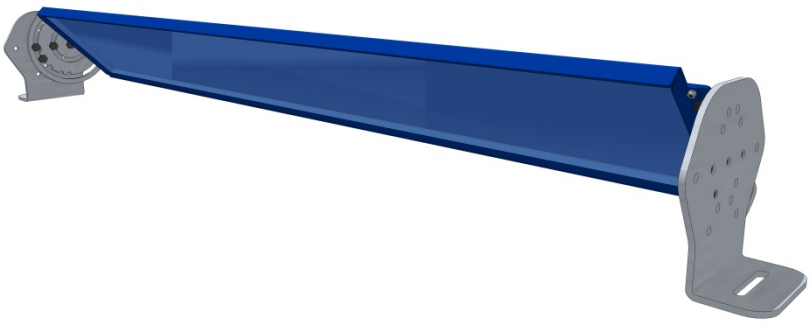
Cleaning the Deflection Mirror

NOTE: Shut down the camera system before performing this maintenance task. Do not stare into the camera's window at the LED light. Avoid direct eye exposure. The LED light level does not constitute a health hazard, however staring at the LED light for prolonged periods could result in eye damage.

Use care when cleaning the deflection mirror to assure that the alignment with the camera is not altered. Never apply cleaning solution directly to the mirror. Always apply the solution to a cloth, and then the cloth to the mirror. It is a good habit to pre-mark the mirror position, so if it does move it can be returned to the original position.

This procedure is recommended only if it is noticed that the environment is dirty enough that HEAVY deposits are appearing on the deflection mirrors. The cleaning procedure should be performed without removing the mirror from the mounting structure.

1. Switch off the conveyor.
2. Switch off the camera system.
3. Review the exterior cleaning procedure before cleaning the deflection mirror.
4. Check the deflection mirror for any dust, dirt, or smudges. If the deflection mirror needs to be cleaned, proceed to **Step 5.**
5. Use a dry, soft, lint-free cloth to remove accumulated dust.
6. If the deflection mirror is particularly dirty or smudged, make a solution of seven parts denatured alcohol and three parts water. (Many over-the-counter solutions will leave deposits/smudges that can affect performance.)
7. Apply the cleaning solution to a lint-free cloth.
8. Apply the cloth with the cleaning solution to the mirror.
9. Remove any streaks or remaining moisture from the mirror with a dry, soft, lint-free cloth or lens paper.
10. Verify camera operation.



Cleaning the RangeFinder Windows

NOTE: Shut down the camera system before performing this maintenance task. Do not stare into the camera's window at the LED light. Avoid direct eye exposure. The LED light level does not constitute a health hazard, however staring at the LED light for prolonged periods could result in eye damage.

Use care when cleaning the RangeFinder to assure the windows are not scratched or damaged in any way. Never apply cleaning solution directly to the windows. Always apply the solution to a cloth, and then the cloth to the windows.

This procedure is recommended only if it is noticed that the environment is dirty enough that deposits are appearing on the RangeFinder windows. The cleaning procedure should be performed without removing the RangeFinder from the mounting structure.

1. Switch off the conveyor.
2. Switch off the camera system.
3. Review the exterior cleaning procedure before cleaning the three windows.
4. Check the windows for any dust, dirt, or smudges. If the window needs to be cleaned.
5. Use a dry, soft, lint-free cloth to remove accumulated dust.
6. If the windows are particularly dirty or smudged, make a solution of seven parts denatured alcohol and three parts water. (Many over-the-counter solutions will leave deposits/smudges that can affect performance.)
7. Apply the cleaning solution to a cotton swab or lint-free cloth.
8. Apply the cleaning solution to the windows.
9. Remove any streaks or remaining moisture with a dry, soft, lint-free cloth or lens paper.
10. Verify RangeFinder operation.

Cleaning the Photoelectric Sensor

If your application uses the photoelectric sensor option as a hardware trigger, be sure to clean the photoelectric sensor periodically as outlined below.

1. Switch off the conveyor.
2. Switch off the camera system.
3. Clean the photoelectric sensor's lens using the denatured alcohol solution and a cotton swab or lens paper.
4. Clean the reflector using the denatured alcohol solution and a cotton swab or lens paper.
5. Verify photoelectric sensor operation.

Cleaning the Tachometer

If your application uses the tachometer option for tracking purposes, be sure to clean the tachometer wheels periodically as outlined below.

1. Turn off the product transport.
2. Turn off the barcode reader by disconnecting the power source.
3. Using a clean, soft cloth, wipe the wheels of the tachometer clean using a mild detergent solution.
4. Before restarting the system, be sure the tachometer is making good contact with the product transport.
5. Verify tachometer operation.

Tighten Mounting Hardware

1. Check all AV7000, Deflection Mirrors, CBX connection boxes, and power supply mounting hardware as applicable. Tighten as necessary. Do not over-tighten. Be sure not to disturb the equipment's alignment as it relates to the product transport.
2. Check the mounting hardware of the Photoelectric Sensor (if this option is being used). Tighten as necessary. Do not over-tighten.
3. Check the mounting hardware of the tachometer (if this option is being used). Tighten as necessary. Do not over-tighten.

Checking Barcode Reading System Connections

This is a safety check recommended for harsh environments where vibration may be a problem. See **"Electrical Installation" on page 45**.

1. Check all wiring connections to the camera and illumination connector panels. Tighten any loose connections as necessary. Do not over-tighten.
2. Check all wiring connections to the CBX connection box. Tighten any loose connections as necessary. Do not over-tighten.

3. Check all cabling/conduit for signs of wear/damage. Repair/replace any damaged cable connections as necessary.

Verify Barcode Reader Operation

If after performing maintenance, the imaging system continues to perform below the normal operations experienced with the system under normal daily conditions, contact Datalogic through our website at www.datalogic.com.

Verify Photoelectric Sensor Operation

1. Block the Photoelectric Sensor emitter beam to confirm it is aligned properly with the reflector.
2. Verify that the TRIGGER LED on camera lights when photoelectric sensor beam is blocked.
3. If the photoelectric sensor's LED does not change status, adjust the photoelectric sensor so that it is properly aligned with the reflector.
4. If the TRIGGER LED on the barcode reader does not light when the photoelectric sensor's beam is blocked, check the cabling between the photoelectric sensor and CBX connection box for damage. 0.

Verify Tachometer Operation

1. Rotate the tachometer wheel slowly.
2. The **TACH** LED on camera's connector panel should flash indicating the tachometer is operational.

CHAPTER 9
TROUBLESHOOTING

NOTE: Due to the complex and application-specific nature of these installations, operational deficiencies of the barcode reader must be diagnosed and serviced by a trained and authorized Datalogic technician.

There are no user serviceable components or field replaceable units (FRUs) inside the barcode reader.

For further information on training, contact us through the Datalogic website at www.datalogic.com.

When contacting Datalogic for help with an AV7000 camera or AI7000 Illumination, please be ready to share the unit serial number with the Datalogic technician. The unit's serial number tag is located on the bottom of the device, as shown below. Help desk contact information is available at www.datalogic.com.

ERROR CODES AND RESOLUTIONS

Decoder Errors

Alphabetical by type: Error / Warning / Info.

e-Genius Description	Type	Explanation	Possible Cause	Solution
Application failed to shutdown	Info	The application was in a state where it could not shut down properly.	If software was recently loaded, an error occurred during the load.	Cycle the unit's power. If software was recently loaded, try to reload the new software. If the error persists, contact Datalogic Support.
Application failed to start	Error	One of the applications failed to properly start and is not functioning.	The application was unable to initialize its interfaces properly and failed. If software was recently loaded, an error occurred during the load.	Cycle the unit's power. If software was recently loaded, try to reload the new software. If the error persists, contact Datalogic Support.
Bad scanline data detected	Error	Raw data from the image buffer is corrupt.	RAM is corrupt or bad.	Contact Datalogic Support.
Camera status not understood	Error	Received camera status was not understood.	Make sure all of the cameras in the tunnel contain the same software.	Load the same software into all of the cameras in the tunnel.
Configuration not synchronized with cluster	Error	XML does not match the XML in other cameras.	XML from a custom version of software was loaded into a camera running STD software.	Default the camera and reboot. That will force the camera to load the appropriate XML.
Could Not Save JPEG - Compression Failed	Error	JPEG compression failed.	Image was too big or too small. Compression was interrupted.	Contact Datalogic Support if this error persists.
Could Not Save JPEG - Job Queue is Full	Error	Internal JPEG queue is full.	JPEG compression is taking too long.	Contact Datalogic Support if this error persists.
Could Not Save JPEG - Queue is Full	Error	Internal JPEG queue is full.	JPEG compression is taking too long.	Contact Datalogic Support if this error persists.
Could Not Save JPEG - Waiting for FPGA	Error	Attempt to compress a JPEG while another compression is taking place.	JPEG compression is taking too long.	Contact Datalogic Support if this error persists.
Dimensioner Beacon not understood	Error	Status received from the Dimensioner was not understood.	The dimensioner is not running a version of software that is compatible with the camera.	Load the correct software into the dimensioner.
Error Configuring the Decode Engine	Error	Parameter settings used to configure the decode engine were rejected.	A decode engine parameter is out of range.	Make sure all decode engine settings are correct. Contact Datalogic Support.
Expected Camera is Offline	Error	A camera in the tunnel configuration is not online.	The Offline camera has lost power or restarted. The Offline camera failed to start properly. The SyncNet cables are not connected properly to the camera listed offline.	Verify the offline camera has power. Verify the SyncNet cables are connected properly between the offline camera and next camera. Cycle the unit's power. If the error persists, replace the camera and/or contact Datalogic Support.
Failed to set space notification	Error	Camera could not set a delayed encoder/ tachometer event.	Encoder/tachometer resolution is set too high.	Check the encoder/tachometer resolution. Contact Datalogic Support if the encoder/ tachometer resolution is set properly.
Failed to Allocate Memory for Image Transfer	Error	Requested image could not be loaded into memory.	RAM is bad or corrupt.	Contact Datalogic Support.
Failed to Login to FTP Server	Error	The camera was unable to log into the specified FTP server to save images.	The log in credentials are incorrect. The external FTP server is offline. The camera Image port is not connected to the network to get to the FTP server.	Verify the login credentials are correct. Verify the external FTP server is up and running. Verify the camera image port is correctly connected to the appropriate network.
Failed to Read Image from Ramdisk	Error	Requested Image no longer available in Ramdisk.	Parameter updated performed while sorting packages. Image transfer taking too long.	Check the network connection speed.

e-Genius Description	Type	Explanation	Possible Cause	Solution
Failed to Write Image to File System	Error	The camera was unable to save the image file to the specified File System Location.	The file system location is incorrect or full.	Verify that the Image saving settings for the file system are correct. Verify the location is not full or set up the file maintenance to remove old files automatically.
Failed to Write Image to FTP Server	Error	The camera was unable to write the image to the FTP server.	The external FTP server is offline. The camera Image port is not connected to the network to get to the FTP server.	Verify the external FTP server is up and running. Verify the camera image port is connected to the appropriate network correctly.
Failed to Write Image to Offline Viewer	Error	The camera was unable to send an image to the external viewer.	External viewer is not running or it's not a version meant for the AV7000. Parameters required to send images to the external viewer are not set properly.	Make sure the external viewer is running. Make sure the external viewer was downloaded from the camera. Make sure the external viewer network parameters on the Modify Settings | Global Settings | Image Saving Destination Settings window are properly set (See section).
Far Working Distance Out of Range	Error	The far working distance is set to a distance beyond the focus range of the camera.	The far working distance is set incorrectly. The camera being used is incorrect for the application.	Verify the camera model is correct for the application. Re-run the calibration wizard on this camera.
Fixed Focus Value Out of Range	Error	The fixed focus setting is set to a distance beyond the focus range of the camera.	The fixed focus value is set incorrectly. The camera being used is incorrect for the application.	Verify the fixed focus value is correct. Verify the camera model is correct for the application.
Image Transfer Falling Behind. Check Connection Speed	Error	The volume of images to be saved is exceeding the hardware capabilities of the Image port connection.	The Ethernet connected to the camera Image port (cables, switches, etc.) are not Gigabit capable.	Verify the switches are Gigabit capable and the cables are at least Cat5e. Verify the LED's of the camera Image port is indicating a Gigabit connection. Verify the Ethernet are not routed with AC wiring and are not excessively long.
Image Saving Queue is Full. Check Connection Speed	Error	Requested package is no longer available to save.	Image transfer is taking too long, resulting in lost packages.	Check the network connection speed.
IV Monitor failed to get an image buffer	Error	Camera could find the raw image buffer.	RAM is corrupt or bad.	Contact Datalogic Support.
LogManager can't open a log file	Error	Log Manager was unable to open the log file on the media device.	Log file media device is unavailable or full.	Verify logging options.
LogManager can't write to the log file	Error	Log Manager was unable to write to the log file on the media device.	Log file media device is unavailable or full.	Verify logging options.
Maximum Application restarts	Error	An application was restarted multiple times due to an error.	If software was recently loaded, an error occurred during the load. An internal hardware failure exists.	Cycle the unit's power. If software was recently loaded, try to reload the new software. If the error persists, contact Datalogic Support.
Maximum system resets in one day	Error	The system became unresponsive multiple times within a 24 hour period and was reset.	If software was recently loaded, an error occurred during the load. An internal hardware failure exists.	Cycle the unit's power. If software was recently loaded, try to reload the new software. If the error persists, replace the camera and/or contact Datalogic Support.
No ACK from Rangefinder after Parameter Update	Error	RangeFinder did not Ack the last parameter update.	Communication with the RangeFinder is compromised.	Check the Ethernet connection with the RangeFinder.
Not Saving BMP Image. Request Too Late	Error	Requested package is no longer available to save.	Image transfer is taking too long, resulting in lost packages.	Check the network connection speed.
RangeFinder is not Online	Error	The RangeFinder is selected as the position sensor but is not detected as being online.	The RangeFinder is powered off or not connected. The Range finder is not the position sensor being used.	If the RangeFinder is not the position sensor being used, select the appropriate position sensor. Verify the RangeFinder has power. Verify the network port of the RangeFinder is connected to the Ethernet Focus port of one of the cameras. Cycle the RangeFinder power. If the error persists, replace the RangeFinder and/or contact Datalogic Support.

e-Genius Description	Type	Explanation	Possible Cause	Solution
RangeFinder status not understood	Error	The status message received from the RangeFinder was not understood by the camera.	The RangeFinder software is out of date.	Load the appropriate software into the RangeFinder.
Real-Time Processor has Errors	Error	The Real-Time Processor is reporting an error.	Check the Real-Time Processor section of the System Info > Device Details window for detailed error information (see).	Check the Real-Time Processor section of the System Info > Device Details window for detailed error information (see Device Details in online help). Refer to the Real-Time Processor error list for more information.
Real-Time Processor is not Online	Error	The Real-Time Processor is unable to communicate with the Decoder.	Real-Time Processor has stopped functioning. Internal hardware failure.	Cycle the unit's power. If the error persists, replace the camera and/or contact Datalogic Support.
Real-Time Processor status not understood	Error	Status received from the Real-Time Processor was not understood.	Make sure the Real-Time Processor software version is compatible with the Application software.	Load a compatible version of Real-Time Processor software.
Software upgrade failed	Error	An attempt to load upgraded software failed.	There is a type mismatch with the existing software and the new software being loaded. An error occurred while loading software.	Verify the software type being loaded matches that of the existing software. If you are intentionally changing the software type, check the box to skip software type compatibility check when loading the new software file. Cycle the unit's power, and re-attempt to load software.
Bottom Camera Distance to Scanline too Small	Warning	The distance from the position sensor scan line to the bottom camera scan line is too small.	The position sensor is mounted incorrectly, too close to the camera. The bottom camera is mounted incorrectly.	Verify and move the position sensor further upstream if needed. Verify and move the camera further downstream if needed.
Could Not Save JPEG - Image Too Large	Warning	Requested image is too large to compress.	Photo sensor or Position sensor obstructed or a package jam resulting in an extremely long package.	Eliminate package jams. Make sure the photo sensor and/or position sensor are not obstructed.
Could Not Save JPEG - Image Too Small	Warning	Requested image is too small to compress.	Debris on the conveyor.	Check for junk on the conveyor resulting in extremely small packages.
Decoder board over temperature	Warning	The Decoder board has exceeded the maximum temperature.	Ambient temperature has exceeded the maximum 50 degrees C operating temperature. There is a fan failure or airflow blockage.	Verify the ambient temperature is less than or equal to 50 C. Check the fan operation and for any airflow obstructions. Replace fans if necessary.
Decoder CPU over temperature	Warning	The Decoder CPU exceeding the maximum temperature.	Ambient temperature has exceeded the maximum 50 degrees C operating temperature. There is a fan failure or airflow blockage.	Verify the ambient temperature is less than or equal to 50 C. Check the fan operation and for any airflow obstructions. Replace fans if necessary.
Distance to Scanline too small	Warning	The distance from the position sensor scan line to the closest point of the camera line of sight is too small.	The position sensor is mounted incorrectly, too close to the camera. The camera is mounted incorrectly or the angle is wrong.	Verify and move the position sensor further upstream if needed. Verify and move the camera further downstream if needed. Verify and correct the camera angle if needed.
IV State Not Sent - Pkg Not Found	Warning	A trigger message for a package was received but the package was never found in the image data.	This can occur during boot up if packages are running through the tunnel or if a package is completely shadowed.	Contact Datalogic Support if this error persists.
RangeFinder is not Expected	Warning	A RangeFinder is detected in the system but is not selected as the position sensor.	Wrong position sensor is selected in the configuration.	Select the RangeFinder as the position sensor in the configuration.
RangeFinder is not OK	Warning	The RangeFinder is online but reporting an error.	Check the RangeFinder GUI page for error details.	Check the RangeFinder GUI page for error details. Refer the RangeFinder error list for more information.
Real-time Processor has Warnings	Warning	The Real-Time Processor is reporting at least one warning.	Check the Real-Time Processor section of the **Modify Settings | System Info > Device Details** window for detailed warning information (See Device Details in online help.)	Check the Real-Time Processor section of the **Modify Settings | System Info > Device Details** window for detailed warning information (See Device Details in online help). Refer to the Real-Time Processor warning list for more information.

e-Genius Description	Type	Explanation	Possible Cause	Solution
Software upgrade in progress	Warning	The camera is in the process of updating software.	A software update was loaded on this camera or one of the cameras in the tunnel and auto-update is enabled.	Wait for the update to complete.
Unable to mount SMB/CIFS file share for image saving	Warning	The camera was unable to mount the SMB/CIFS file share on the external device.	File System parameters on the Modify Settings | Global Settings | Image Saving Destination Settings window are not correct (See Device Details in online help). External device is not available. The Server Path is set to a path local to the camera.	Make sure the File System parameters on the Modify Settings | Global Settings | Image Saving Destination Settings window are properly set (See). Make sure the Server Path is not local to the camera.
Unexpected Camera is Online	Warning	A camera is detected in the tunnel that was not part of the tunnel configuration.	A new camera was added to the tunnel or an existing camera was replaced.	Add the camera to the configuration and proceed with the set up if it is a new camera. If an existing camera was replaced, there should be an offline camera. From the Modify Settings | System Info, replace the offline camera with one listed outside the cluster (See System Information in online help).
Decoder load warning	Info	Decode engine CPU usage is high.	Background is noisy. Multiple 2D codes are enabled. Camera gain is too low or too high or the camera is out of focus.	Make sure gain and focus are set properly. Otherwise this error will not cause any problems.
Decoder overload error	Info	Decode engine is being killed before the package is complete.	Background is noisy. Multiple 2D codes are enabled. Camera gain is too low or too high or the camera is out of focus. Transmit point distance is too close.	Make sure gain and focus are set properly. Increase the transmit point distance if possible.
Driver returned an error	Info	PCIe driver returned an error.	HW issue with the PCIe bus or the FPGA.	Contact Datalogic Support if this error persists.

Real-Time Processor Errors

Alphabetical by type: Error / Warning / Info

e-Genius Description	Type	Explanation	Possible Cause	Solution
Error: Calibration Manager stopped responding	Error	The Calibration Manager application has stopped.	The application has stopped responding or crashed.	Cycle the unit's power. If the error persists, replace the camera and/or contact Datalogic Support.
Error: Diagnostic Monitor stopped responding	Error	The Diagnostic Monitor application has stopped.	The application has stopped responding or crashed.	Cycle the unit's power. If the error persists, replace the camera and/or contact Datalogic Support.
Error: Failed to Load Focus Table	Error	RTP failed to load the focus table.	Focus table was not received or is corrupt.	Contact Datalogic Support.
Error: Failed to Load Gain Table	Error	RTP failed to load the gain table.	Gain table was not received or is corrupt.	Contact Datalogic Support.
Error: Failed to Load Illumination Table	Error	RTP failed to load the illumination table.	Illumination table was not received or is corrupt.	Contact Datalogic Support.
Error: Failed to read illumination profile	Error	The camera was unable to read the illumination profile from the illumination.	Illumination not present. Interface window between camera and illumination blocked. Illumination internal failure.	Verify the camera is fully seated to the illumination. Verify there is nothing blocking the small windows between the camera and the illumination. Verify the illumination is powered up and has no errors. Cycle the unit's power. If the error persists, replace the camera or illumination and/or contact Datalogic Support.
Error: Failed to read Illumination temp	Error	The illumination interface is unable to read the internal temperature.	An internal failure occurred in the illumination.	Cycle the unit's power. If the error persists, replace the illumination and/or contact Datalogic Support.
Error: Failed to save illumination profile	Error	The illumination profile could not be saved.	Communication with the illumination has been compromised.	Contact Datalogic Support.
Error: Fixed Focus Value Out of Range	Error	The current fixed focus value is set beyond the far working distance for the camera.	Parameter set incorrectly.	Change the fixed focus value to be equal to or less than the far working distance value.
Error: Focus Port Mon stopped responding	Error	The Focus Port Monitor application has stopped.	The application has stopped responding or crashed.	Cycle the unit's power. If the error persists, replace the camera and/or contact Datalogic Support.
Error: Focus Servo Mon stopped responding	Error	The Focus Servo Monitor application has stopped.	The application has stopped responding or crashed.	Cycle the unit's power. If the error persists, replace the camera and/or contact Datalogic Support.
Error: FSM Data Valid	Error	The focus servo EEPROM is not valid or is corrupt.	Data corruption while reading the EEPROM.	Cycle the unit's power. If the error persists, replace the camera and/or contact Datalogic Support.
Error: FSM exceeded max temp	Error	The focus servo exceeded the maximum internal temperature.	Ambient temperature has exceeded the maximum 50 degrees C operating temperature. There is a fan failure or airflow blockage.	Verify the ambient temperature is less than or equal to 50 C. Check the fan operation and for any airflow obstructions. Replace fans if necessary.
Error: FSM Invalid Servo command received	Error	The camera received an invalid command response from the focus servo.	Internal communication failure.	Cycle the unit's power. If the error persists, replace the camera and/or contact Datalogic Support.
Error: FSM Invalid Servo packet received	Error	The camera received an invalid data packet for the command from the focus servo.	Internal communication failure.	Cycle the unit's power. If the error persists, replace the camera and/or contact Datalogic Support.
Error: FSM PWM Over Limit	Error	The focus servo exceeding the maximum PWM attempting to get to the commanded position.	The shipping lock is still engaged or partially engaged. There is an internal hardware failure.	Verify the shipping lock is fully disengaged. Cycle the unit's power. If the error persists, replace the camera and/or contact Datalogic Support.

e-Genius Description	Type	Explanation	Possible Cause	Solution
Error: FSM PWM Over Time	Error	The focus servo exceeding the maximum PWM timeouts attempting to get to the commanded position.	The shipping lock is still engaged or partially engaged. There is an internal hardware failure.	Verify the shipping lock is fully disengaged. Cycle the unit's power. If the error persists, replace the camera and/or contact Datalogic Support.
Error: FSM Servo reception	Error	The camera is unable to receive messages from the focus servo.	Internal communication failure.	Cycle the unit's power. If the error persists, replace the camera and/or contact Datalogic Support.
Error: FSM Servo Transmission	Error	The camera is unable to send messages to the focus servo.	Internal communication failure.	Cycle the unit's power. If the error persists, replace the camera and/or contact Datalogic Support.
Error: GPIO Handler stopped responding	Error	The GPIO Handler application has stopped.	The application has stopped responding or crashed.	Cycle the unit's power. If the error persists, replace the camera and/or contact Datalogic Support.
Error: Illumination exceeded max temp	Error	The illumination exceeded the maximum internal temperature	Ambient temperature has exceeded the maximum 50 degrees C operating temperature. There is a fan failure or airflow blockage.	Verify the ambient temperature is less than or equal to 50 C. Check the fan operation and for any airflow obstructions, particularly at the ends of the illumination. Replace fans if necessary.
Error: Illumination Mon stopped responding	Error	The Illumination Monitor application has stopped.	The application has stopped responding or crashed.	Cycle the unit's power. If the error persists, replace the camera and/or contact Datalogic Support.
Error: Image Line Handler stopped responding	Error	The Image Line Handler application has stopped.	The application has stopped responding or crashed.	Cycle the unit's power. If the error persists, replace the camera and/or contact Datalogic Support.
Error: Image Sensor Mon stopped responding	Error	The Sensor Monitor application has stopped.	The application has stopped responding or crashed.	Cycle the unit's power. If the error persists, replace the camera and/or contact Datalogic Support.
Error: Interrupt Handler stopped responding	Error	The Interrupt Handler application has stopped.	The application has stopped responding or crashed.	Cycle the unit's power. If the error persists, replace the camera and/or contact Datalogic Support.
Error: LED Bar Failed	Error	The illumination controller has indicated an issue with a LED module.	An internal failure occurred in the illumination.	Cycle the unit's power. Verify all of the LED modules in illumination come on. If the error persists, replace the illumination and/or contact Datalogic Support.
Error: Network Logger stopped responding	Error	The Network Logger Monitor application has stopped.	The application has stopped responding or crashed.	Cycle the unit's power. If the error persists, replace the camera and/or contact Datalogic Support.
Error: Network Rx stopped responding	Error	The Network Receive Monitor application has stopped.	The application has stopped responding or crashed.	Cycle the unit's power. If the error persists, replace the camera and/or contact Datalogic Support.
Error: Network TX stopped responding	Error	The Network Transmit Monitor application has stopped.	The application has stopped responding or crashed.	Cycle the unit's power. If the error persists, replace the camera and/or contact Datalogic Support.
Error: Parameter Manager stopped responding	Error	The Parameter Manager application has stopped.	The application has stopped responding or crashed.	Cycle the unit's power. If the error persists, replace the camera and/or contact Datalogic Support.
Error: Position Sensor Too Close to Camera	Error	The position sensor is mounted too close to the camera and incoming focus data cannot be processed.	The camera is mounted too close to the position sensor or the distance to scan line parameter is not set properly.	Check the distance to scan line parameter. The camera will need to be moved if the distance to scan line parameter is set to the correct value.
Error: Proc Tach Array stopped responding	Error	The Process Tach Array application has stopped.	The application has stopped responding or crashed.	Cycle the unit's power. If the error persists, replace the camera and/or contact Datalogic Support.

e-Genius Description	Type	Explanation	Possible Cause	Solution
Error: Process Tracking Manager stopped responding	Error	The Process Tracking Manager application has stopped.	The application has stopped responding or crashed.	Cycle the unit's power. If the error persists, replace the camera and/or contact Datalogic Support.
Error: Recovery Mode. Software Load Required!	Error	RTP is running recovery applications. RTP software must be loaded before the camera will function properly.	RTP software upload failed or the RTP SD card is new.	Load RTP software via the GUI.
Error: Sensor Board Communication	Error	The Real-Time Processor is unable to communicate to the sensor.	Internal communication failure.	Cycle the unit's power. If the error persists, replace the camera and/or contact Datalogic Support.
Error: Sensor Board Error Loading CCI	Error	An error may have occurred while writing the CCI software to the sensor.	An error occurred writing the software to the sensor.	Cycle the unit's power. Verify the Sensor SW did not update by checking the version. If the version updated then it loaded correctly. If not, re-attempt to load the software. If the error persists, replace the camera and/or contact Datalogic Support.
Error: Sensor Board Error Loading FPGA	Error	An error may have occurred while writing the FPGA software to the sensor.	An error occurred writing the software to the sensor.	Cycle the unit's power. Verify the Sensor SW did not update by checking the version. If the version updated then it loaded correctly. If not, re-attempt to load the software. If the error persists, replace the camera and/or contact Datalogic Support.
Error: Sensor Board Error Loading Micro	Error	An error may have occurred while writing the Micro software to the sensor.	An error occurred writing the software to the sensor.	Cycle the unit's power. Verify the Sensor SW did not update by checking the version. If the version updated then it loaded correctly. If not, re-attempt to load the software. If the error persists, replace the camera and/or contact Datalogic Support.
Error: Sensor Board Failure Detected	Error	The camera detected a failure with the sensor.	An internal sensor failure occurred.	Cycle the unit's power. If the error persists, replace the camera and/or contact Datalogic Support.
Error: Status Mon stopped responding	Error	The Status Monitor application has stopped.	The application has stopped responding or crashed.	Cycle the unit's power. If the error persists, replace the camera and/or contact Datalogic Support.
Error: Unable to Read FSM Hardware Version	Error	The camera is unable to receive messages from the focus servo.	Internal communication failure.	Cycle the unit's power. If the error persists, replace the camera and/or contact Datalogic Support.
Error: Unable to Read FSM Software Version	Error	The camera is unable to receive messages from the focus servo.	Internal communication failure.	Cycle the unit's power. If the error persists, replace the camera and/or contact Datalogic Support.
Error: Unable to Read FSM Temperature	Error	The camera is unable to receive messages from the focus servo.	Internal communication failure.	Cycle the unit's power. If the error persists, replace the camera and/or contact Datalogic Support.
Waiting for first parameter update	Error	The Real-Time Processor is waiting for the parameters from the Decoder.	The Decoder is still booting and has not sent the parameters yet. Communications failure between the Real-time processor and the Decoder.	Wait a couple minutes for the Decoder to complete initialization and send the parameters. If the error remains, Cycle the unit's power. If the error still persists, replace the camera and/or contact Datalogic Support.
Warning: External fan failure	Warning	The external fan(s) mounted to the camera have stopped functioning.	Fans are disconnected. Fan hardware failure.	Verify the external fans are connected properly. Replace fan assembly.
Warning: Forced Fixed Focus in PE Only Mode	Warning	Camera is being forced into Fixed Focus because the Photo Sensor is set to Photo-eye only mode.	Photo Sensor is set to PE Only and focus is set to Profile. The RTP will force focus to fixed in this case.	Set focus to fixed and set the fixed focus value.

e-Genius Description	Type	Explanation	Possible Cause	Solution
Warning: Forced Fixed Gain in PE Only Mode	Warning	Camera is being forced into Fixed Gain because the Photo Sensor is set to Photo-eye only mode.	Photo Sensor is set to PE Only and gain is set to Profile. The RTP will force gain to fixed in this case.	Set gain to fixed and set fixed gain and fixed exposure.
Warning: Illumination Fan1 Failed	Warning	The external fan mounted to the illumination has stopped functioning.	Fans are disconnected. Fan hardware failure.	Verify the external fans are connected properly. Replace fan assembly.
Warning: Illumination Fan2 Failed	Warning	The external fan mounted to the illumination has stopped functioning.	Fans are disconnected. Fan hardware failure.	Verify the external fans are connected properly. Replace fan assembly.
Warning: Internal fan failure	Warning	The internal fan has stopped functioning.	Internal fan hardware failure.	Cycle the unit's power. If the error persists, replace the camera and/or contact Datalogic Support.
Warning: Invalid End of IV Detected	Warning	The RTP tried to end a new package before the new package started.	Parameter update was performed with packages running. Multiple focusing devices connected.	Contact Datalogic Support.
Warning: Invalid Start of IV Detected	Warning	The RTP tried to start a new package before the previous package ended.	Parameter update was performed with packages running. Multiple focusing devices connected.	Contact Datalogic Support.
Warning: Linerate exceeds Maximum Linerate	Warning	The required line rate is exceeding the maximum expected line rate based on the belt speed.	The belt speed parameter is set below the actual belt speed. The LPI is set too high.	Verify the belt speed is set just above the actual maximum belt speed. Verify the LPI is set correctly to the application specification.
Info: Failed to Send Focus Command	Info	The camera is unable to send messages to the focus servo.	Internal communication failure.	Cycle the unit's power. If the error persists, replace the camera and/or contact Datalogic Support.
Info: Focus Command Above Max Range	Info	RTP attempted to focus beyond the far working distance of the camera.	Far working distance is not set to the left/right edge of the DM3610 or RangeFinder.	Make sure the far working distance of the camera is set to the left/right edge of the DM3610 or RangeFinder.
Info: Focus Command Below Min Range	Info	RTP attempted to focus beyond the near working distance of the camera.	The camera is mounted too close.	Physically move the camera farther away.
Info: Invalid Height from Position Sensor	Info	Height received from the position sensor is out of range.	Package presented was too tall causing the camera to attempt to focus beyond its near working distance.	Physically move the camera farther away from the conveyor surface.
Info: Invalid Left Offset from Position Sensor	Info	Left offset received from the position sensor is out of range.	Far working distance of right side cameras is not set to the left edge of the DM3610/ Rangefinder or the left offset of the DM3610/ Rangefinder caused a left side camera to attempt to focus beyond its near working distance.	Make sure the cameras are mounted properly and the far working distance of each camera matches the DM3610/ RangeFinder left/right edges.
Info: Invalid Right Offset from Position Sensor	Info	Right offset received from the position sensor is out of range.	Far working distance of left side cameras is not set to the right edge of the DM3610/Rangefinder or the right offset of the DM3610/Rangefinder caused a right side camera to attempt to focus beyond its near working distance.	Make sure the cameras are mounted properly and the far working distance of each camera matches the DM3610/ RangeFinder left/right edges.
Info: Issue Writing to Network	Info	The RTP could not write a message to the network.	A network issue exists between the RTP and computing module.	Cycle the unit's power. If the error persists, replace the camera and/or contact Datalogic Support.
Info: Maximum Digital Gain being used	Info	The digital gain value being used is the maximum value allowed. This could result in noisy and/or dark images.	Conveyor Speed and/or LPI settings are too high. Physical belt speed is too high for the LPI setting required.	Reduce LPI. Make sure the Conveyor speed parameter is set properly. Contact Datalogic Support if all settings are correct.
Info: Reading Calibration tables...	Info	RTP is in the process of reading calibration tables. This only happens during boot up.	Not an issue.	Wait until the calibration tables are loaded.

e-Genius Description	Type	Explanation	Possible Cause	Solution
Info: Reading Illumination Profile...	Info	The camera is reading the illumination profile from the illumination.	The camera reads this data from the illumination on power up.	Wait for the camera to finish reading the illumination profile.
Info: Running FSM Self Test	Info	RTP is running a test script to test the focus mechanism	A production test script was left on the RTP	Contact Datalogic Support
Info: Saving Illumination Profile...	Info	The RTP is in the process of reading the illumination profile from the illumination.	New illumination was connected to the camera.	Wait until the illumination file is finished saving.
Info: Sensor Board Loading CCI	Info	A Sensor Board software patch was loaded and is being written to the sensor.	A Sensor Board software patch was loaded and is being written to the sensor.	Wait for software load to complete.
Info: Sensor Board Loading FPGA	Info	A Sensor Board software patch was loaded and is being written to the sensor.	A Sensor Board software patch was loaded and is being written to the sensor.	Wait for software load to complete.
Info: Sensor Board Loading Micro	Info	A Sensor Board software patch was loaded and is being written to the sensor.	A Sensor Board software patch was loaded and is being written to the sensor.	Wait for software load to complete.
Info: SyncNetwork is not connected in a loop	Info	The AV7000 sync network is not connected in a loop.	One of the two sync network Ethernet ports, on one of the cameras in the tunnel, does not have a cable connected.	Make sure cables are connected from the "In" port to the "Out" port of each camera in the tunnel.
Info: Verifying Sensor Board Status	Info	The camera is reading the status information from the sensor.		Wait for the camera to finish reading the data.

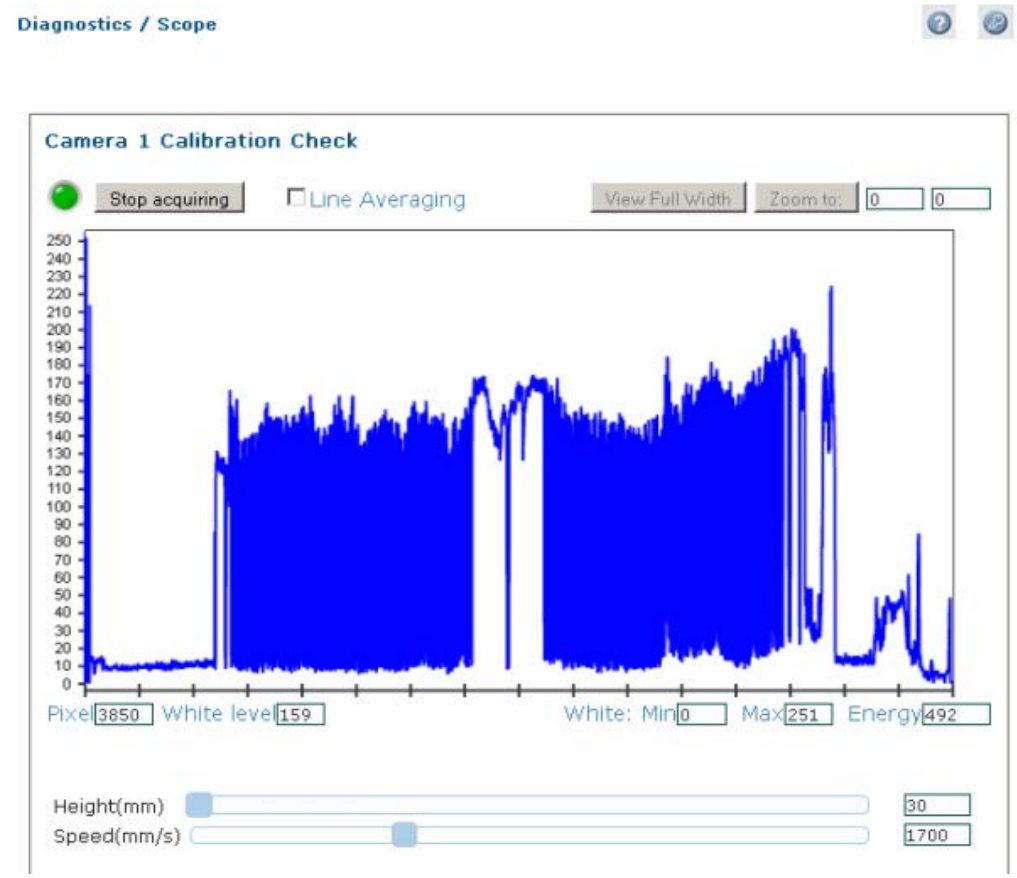
RangeFinder Errors

e-Genius Description	Type	Explanation	Possible Cause	Solution
Error: Image Sensor Read Failure	Error	The RangeFinder is unable to read data from the sensor.	Internal RangeFinder error.	Cycle the unit's power. If the error persists, replace the RangeFinder and/or contact Datalogic Support.
Error: Laser #1 current exceeds limit	Error	The laser current is exceeding its maximum setting.	Laser is at end of life. Internal laser failure.	Cycle the unit's power. If the error persists, replace the RangeFinder and/or contact Datalogic Support.
Error: Laser #1 temperature exceeds limit	Error	The laser is exceeding the maximum temperature limit.	Ambient temperature is exceeding the 50 degrees C maximum operating temperature. Internal laser failure.	Verify the ambient temperature is not exceeding 50 C. Cycle the unit's power. If the error persists, replace the RangeFinder and/or contact Datalogic Support.
Error: Laser #2 current exceeds limit	Error	The laser current is exceeding its maximum setting.	Laser is at end of life. Internal laser failure.	Cycle the unit's power. If the error persists, replace the RangeFinder and/or contact Datalogic Support.
Error: Laser #2 temperature exceeds limit	Error	The laser is exceeding the maximum temperature limit.	Ambient temperature is exceeding the 50 degrees C maximum operating temperature. Internal laser failure.	Verify the ambient temperature is not exceeding 50 C. Cycle the unit's power. If the error persists, replace the RangeFinder and/or contact Datalogic Support.
Error: No valid temperature for laser #1	Error	The RangeFinder is unable to read the laser temperature.	Internal RangeFinder failure.	Cycle the unit's power. If the error persists, replace the RangeFinder and/or contact Datalogic Support.

e-Genius Description	Type	Explanation	Possible Cause	Solution
Error: No valid temperature for laser #2	Error	The RangeFinder is unable to read the laser temperature.	Internal RangeFinder failure.	Cycle the unit's power. If the error persists, replace the RangeFinder and/or contact Datalogic Support.
Error: Sensor data always from DOE #1	Error	Object data is always being detected by DOE#1.	Object stuck on belt. Obstruction in the DOE laser pattern. Beam blockers not set correctly.	Verify there are no objects or obstructions in the DOE laser pattern. Verify the Beam blockers are set correctly. Cycle the unit's power. If the error persists, replace the RangeFinder and/or contact Datalogic Support.
Error: Sensor data always from DOE #2	Error	Object data is always being detected by DOE#2.	Object stuck on belt. Obstruction in the DOE laser pattern. Beam blockers not set correctly.	Verify there are no objects or obstructions in the DOE laser pattern. Verify the Beam blockers are set correctly. Cycle the unit's power. If the error persists, replace the RangeFinder and/or contact Datalogic Support.
Error: Sensor or laser problem (no codewords)	Error	The RangeFinder is unable to see the laser patterns.	There is an obstruction preventing the sensor (in the center of the RangeFinder) to see the laser patterns. An internal Sensor error. The laser patterns are not present or blocked.	Verify there are no obstructions blocking the view of the sensor. Verify there are no obstructions blocking the laser pattern generators. Cycle the unit's power. If the error persists, replace the RangeFinder and/or contact Datalogic Support.
Error: Tach or Tach Sync problem (invalid speed)	Error	The RangeFinder missed a tach sync pulse. The current tach value does not match the tach value in the tach sync message.	Noise on the Ethernet cable connected to the RangeFinder or the tachometer. Device connected without a breakout cable connected to eliminate tach and tach sync.	Make sure cables are not running too close to a motor. Make sure a breakout cable is used when a computer is attached.

VERIFYING FUNCTIONALITY OF THE FOCUS MECHANISM

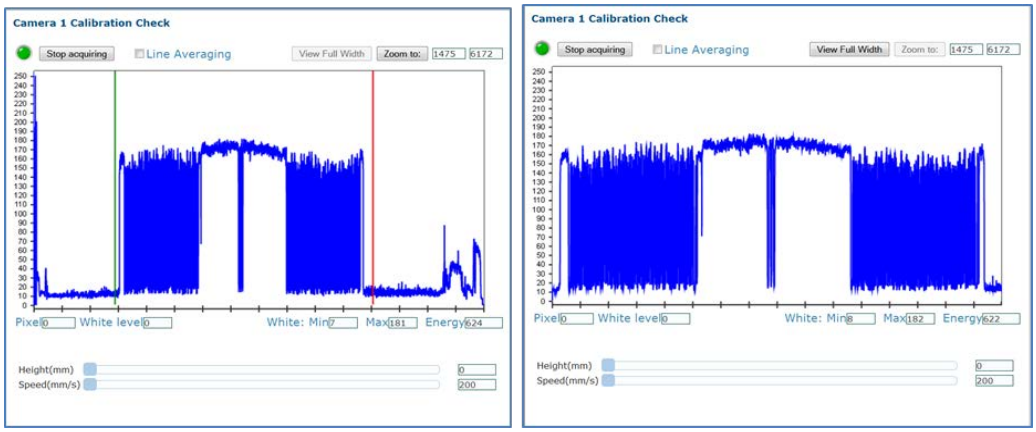
Use the **Scope (Calibration Check)** window to view a software oscilloscope of the camera/illumination performance.



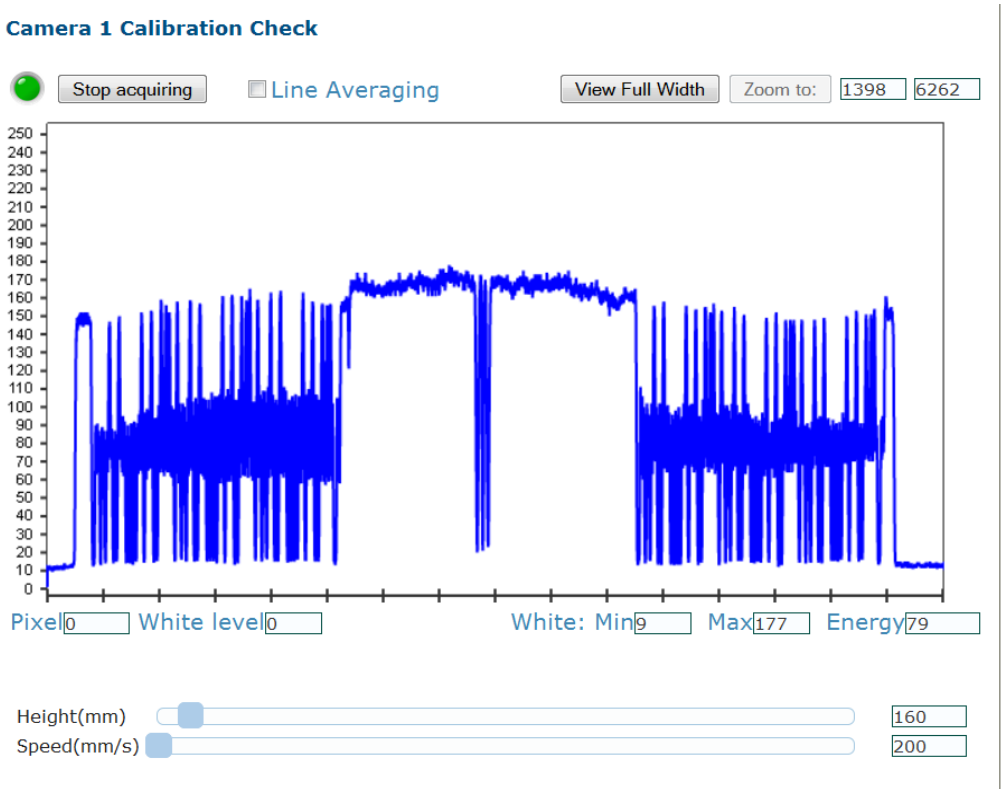
To access the Scope (Calibration Check) window:

1. In the menu tree under Diagnostics, click Scope (Calibration Check). The **Scope (Calibration Check)** window opens.

2. To zoom, click on the right and left sides of the area to be zoomed, and then click Zoom to.



3. Use the sliders at the bottom of the screen to adjust Height (Focus) and Speed (Amplitude).

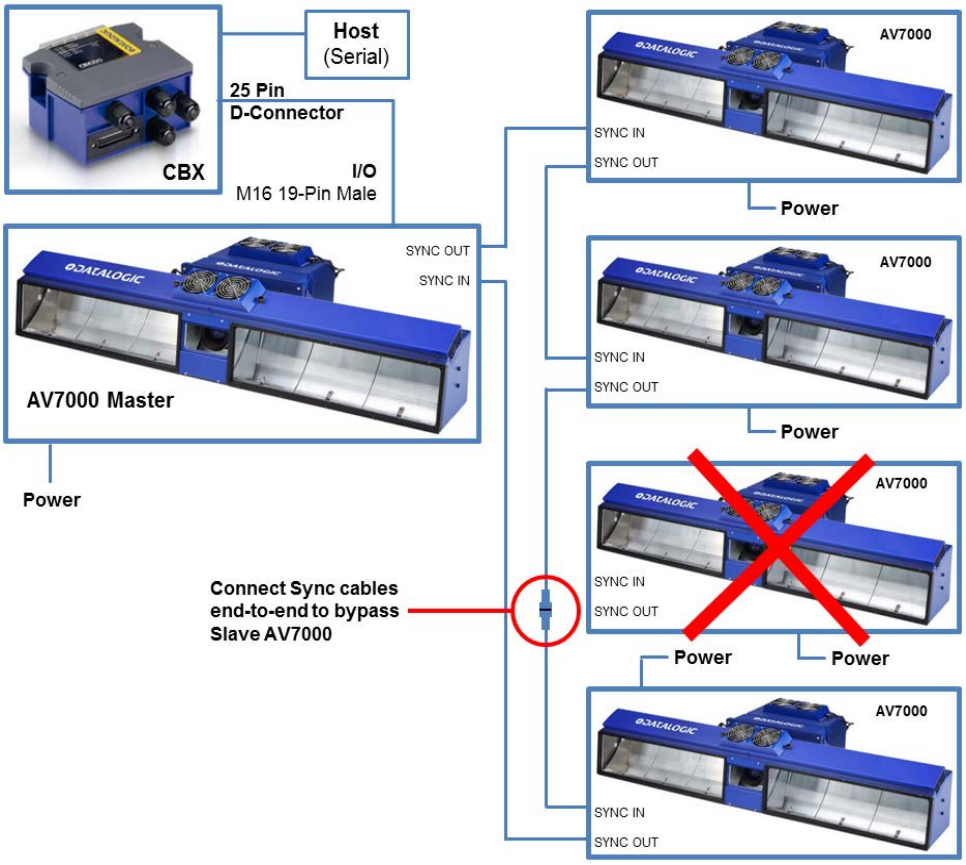


4. Click **Stop Acquiring** to freeze the scope.

BYPASSING AN AV7000 IN AN ARRAY (TUNNEL)

If for any reason, a slave AV7000 needs to be removed from an array (tunnel), it can be bypassed to allow the array to continue functioning in a redundant loop, minimizing down time.

To do this, remove the sync cables from **SYNC IN** and **SYNC OUT** connectors of the slave AV7000 and connect the sync cables end-to-end to complete the sync network. When the slave AV7000 is ready to be brought back into the sync network, reattach the cables to its **SYNC IN** and **SYNC OUT** ports. To bring the slave AV7000 back into the array cluster.



Other Camera Checks

Confirm communication with host

- Serial (if applicable)
- Ethernet (if applicable)
- Confirm Protocol Index (if applicable)

Observe the System in Action

Confirm that all cameras are reading the barcode correctly and that the scan point is communicating to the host.

REPLACING AN AV7000 CAMERA

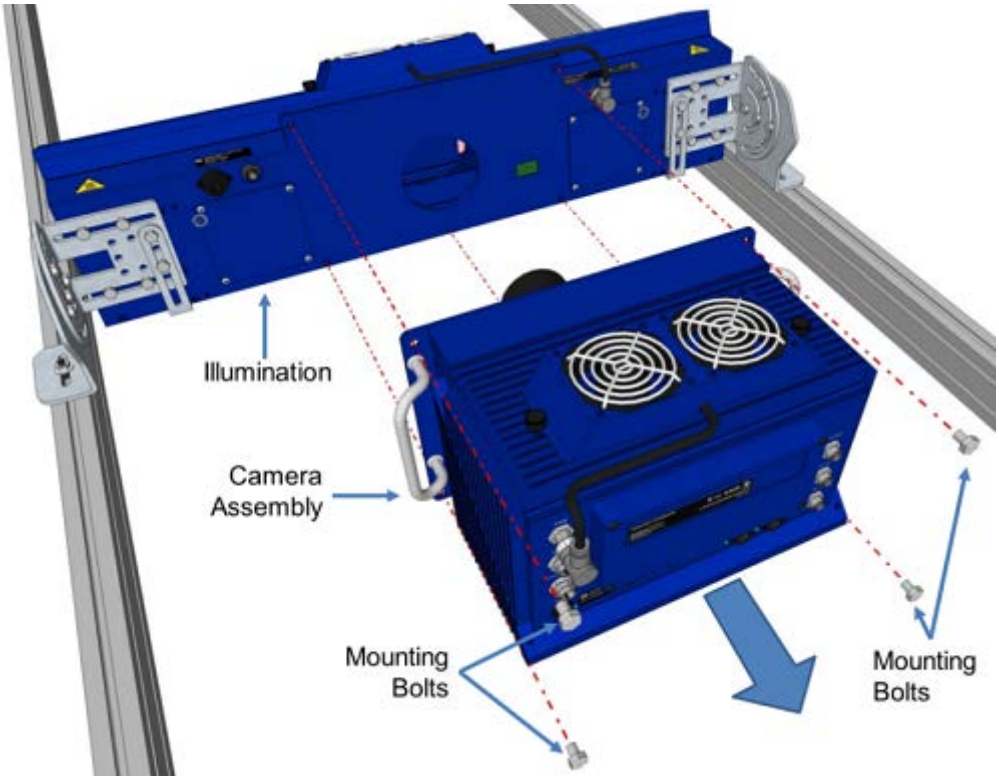
Use the following procedures to replace an AV7000 Camera, either a stand-alone unit, a Master in a tunnel/array, or a Slave unit in a tunnel/array.

NOTE: You will need an AV7000 Controller Key.

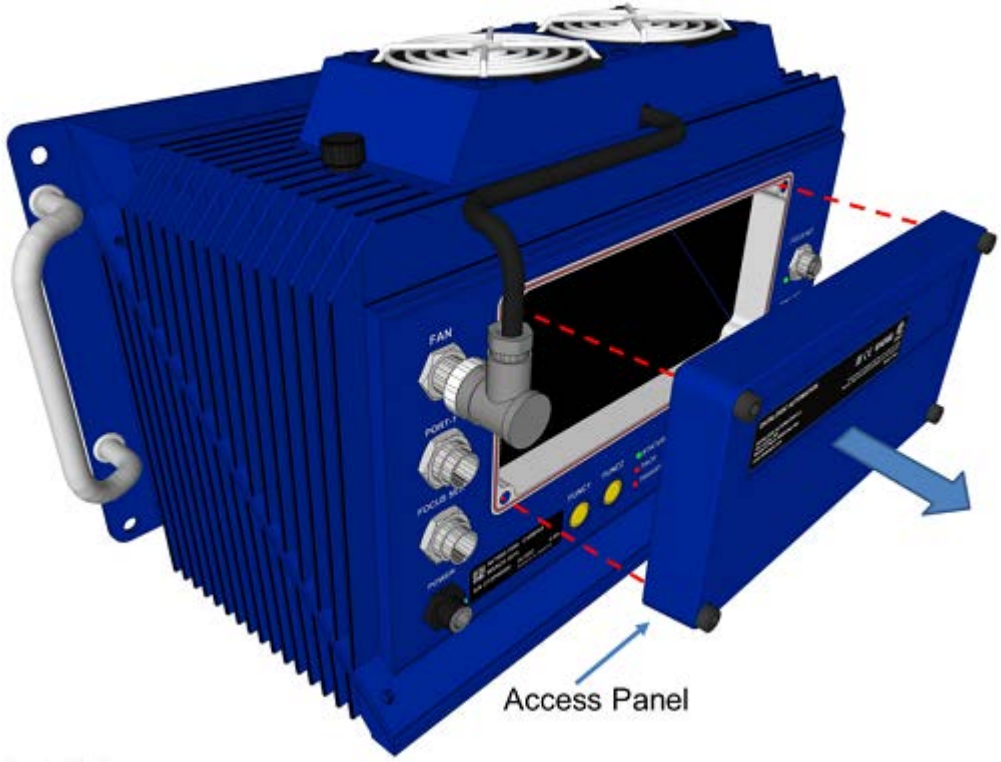
NOTE: Observe precautions to prevent Electrostatic Discharge (ESD). Use an ESD grounding wrist strap and avoid direct contact with circuit boards, which could be damaged by ESD.

1. Disconnect the power source from the camera.
2. Disconnect all the cables except for the fan cable from the camera.

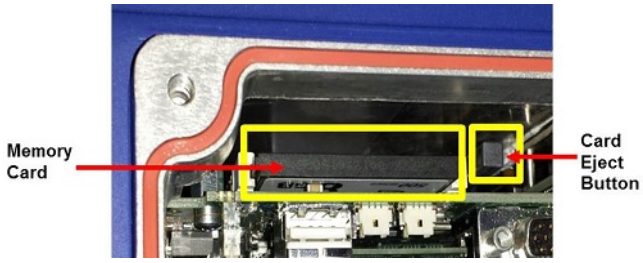
3. Remove the camera from the illumination by unscrewing the four (4) mounting bolts.



4. Place the old camera on a flat surface and remove the back access panel by loosening the retaining screws.



5. Locate the memory card inside the access opening on the upper left side.



6. Press the card eject button and remove the memory card from the camera.

7. Place the replacement camera on a flat surface, and remove the back access panel.
8. Insert the memory card firmly into the card slot in the replacement camera.
9. Reattach the back access panels and secure it with the retaining screws.
10. Attach the replacement camera assembly to the illumination. Lift the camera into place, inserting the lens through the lens hole and the Locator Pin into the Locator Pin Hole.
11. Screw the mounting bolts in place to secure the camera
12. Reattach the cables to the camera in their original locations.
13. Apply power to the AV7000 Camera.

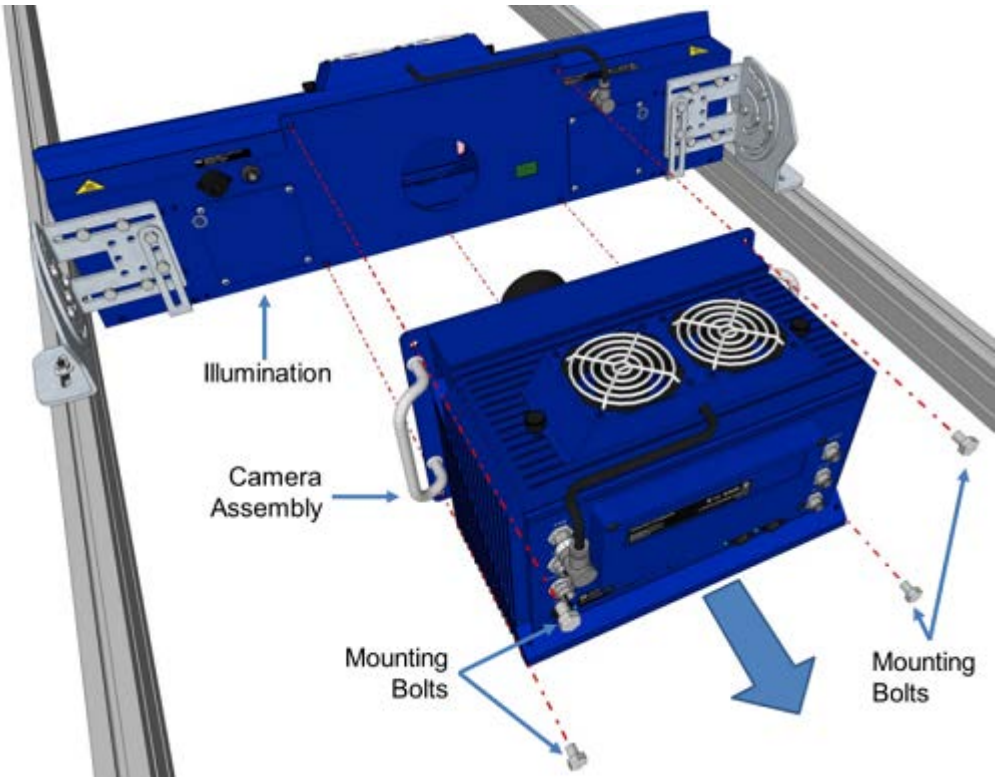
REPLACING AV7000 WITH A FAILED MEMORY CARD

Sometimes a failed memory card can cause a Camera Assembly to fail. In this case replacing the camera assembly and transferring its memory card to a replacement unit will not resolve the problem. In these situations, you need to replace an AV7000 Camera with a failed Memory Card.

This procedure works for both a controller and a client in a tunnel/array. A standalone unit will be handled differently.

1. Disconnect the power source from the camera.
2. Disconnect all the cables except for the fan cable from the camera.

3. Remove the camera from the illumination assembly by unscrewing the four (4) mounting bolts.



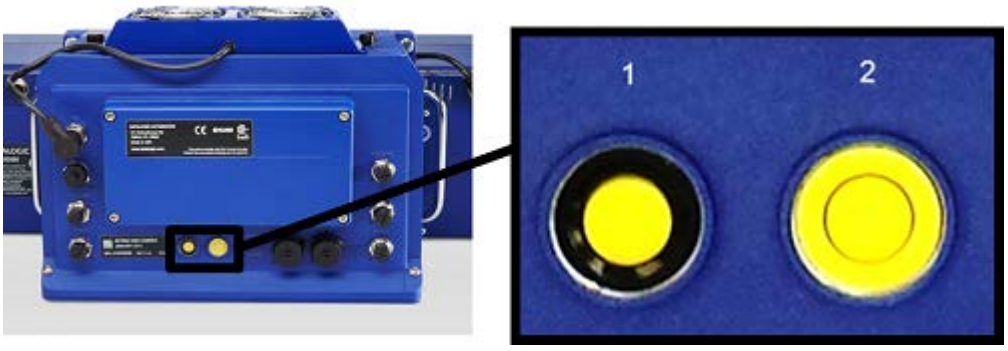
4. Attach the replacement camera assembly to the illumination.
5. Lift the camera into place, inserting the lens through the lens hole and the Locator Pin into the Locator Pin Hole.
6. Screw the mounting bolts back in place to secure the camera.

7. Connect only the power cable to the camera assembly.

NOTE: DO NOT CONNECT ANY OTHER CABLES UNTIL THE FOLLOWING STEPS ARE COMPLETED. If other cables are connected there is a risk that the existing tunnel parameters may get corrupted.

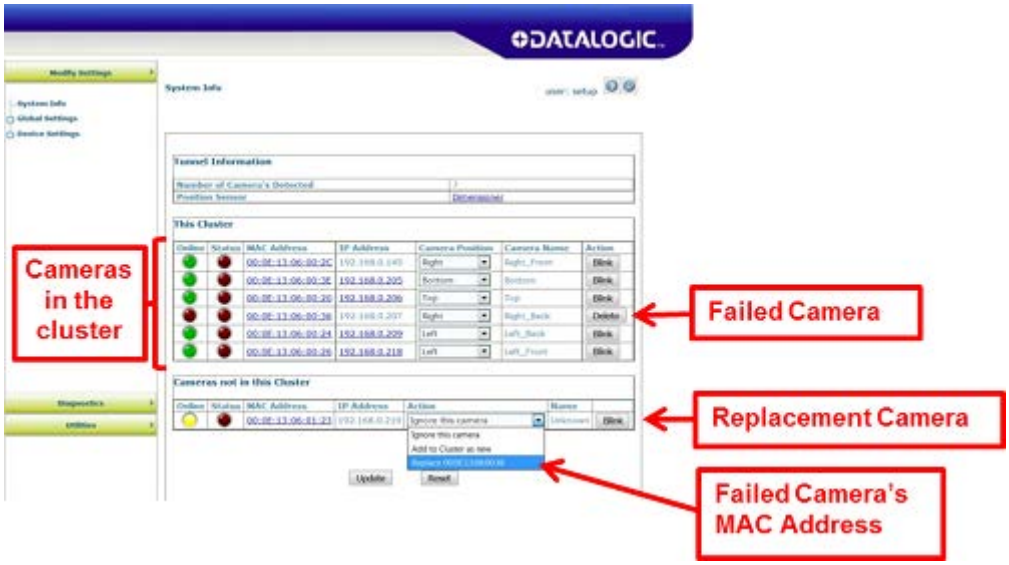
8. Connect the Controller Key (tach dongle) to the I/O port of the AV7000.

9. With the unit powered up, hold down buttons 1 and 2 at the same time. The STATUS LED (located to the right of button #2) will blink GREEN and then RED to indicate that the unit has been defaulted.



10. Disconnect the power connection from the camera assembly.
11. Remove the CONTROLLER KEY from the I/O port of the AV7000.
12. Re-attach all of the cables to the camera in their original locations.
13. Apply power to the AV7000 Camera.

14. Connect the browser to any AV7000 in the tunnel EXCEPT the unit being replaced.
15. Navigate to the System Info page.
16. In the “This Cluster” section of the page the failed camera will show up with the “Delete” option in the Action column. Note the MAC address of this camera.
17. The replacement AV7000 will be found in the “Cameras not in the Cluster” portion of the page.
18. Under the “Action” section select Replace (The MAC address of the failed camera).



CONNECTING A DEFAULTED AV7000 BACK INTO A CLUSTER

When replacing a repaired, **defaulted** AV7000, you must load parameters before you can place it back into an existing cluster. This procedure also assumes you know how to mount, reconnect and access the e-Genius application of an AV7000. See Reference Manual and Installation Guide for more information.

The following procedure describes the steps to follow in order to restore the AV7000 back into the cluster. To proceed with these steps, you will need to save a copy of the XML file from the cluster to an accessible location.

NOTE: You will need an AV7000 Controller Key.

1. Connect a Controller Key into the I/O Port of the AV7000 being placed back into the cluster.

2. **DO NOT** reconnect the sync network cables at this time. They will be reconnected in a later step.
3. Apply power to the AV7000.
4. Connect a PC to the Image Ethernet port (10.0.40.20) of the AV7000.
5. Access the AV7000 e-Genius application, **System Info.**

Tunnel Information

Number of Camera's Detected	1
Position Sensor	RangeFinder

This Cluster

Online	Status	MAC Address	IP Address	Camera Position	Camera Name	Action

Cameras not in this Cluster

Online	Status	MAC Address	IP Address	Action	Name	
		00:0E:13:06:00:6A	192.168.0.198	Ignore this camera	Unknown	Blink

6. This screen snapshot shows the **System Info** screen of the problem AV7000. Because of its defaulted state, it is not considered part of this cluster.

Tunnel Information

Number of Camera's Detected	1
Position Sensor	RangeFinder

This Cluster

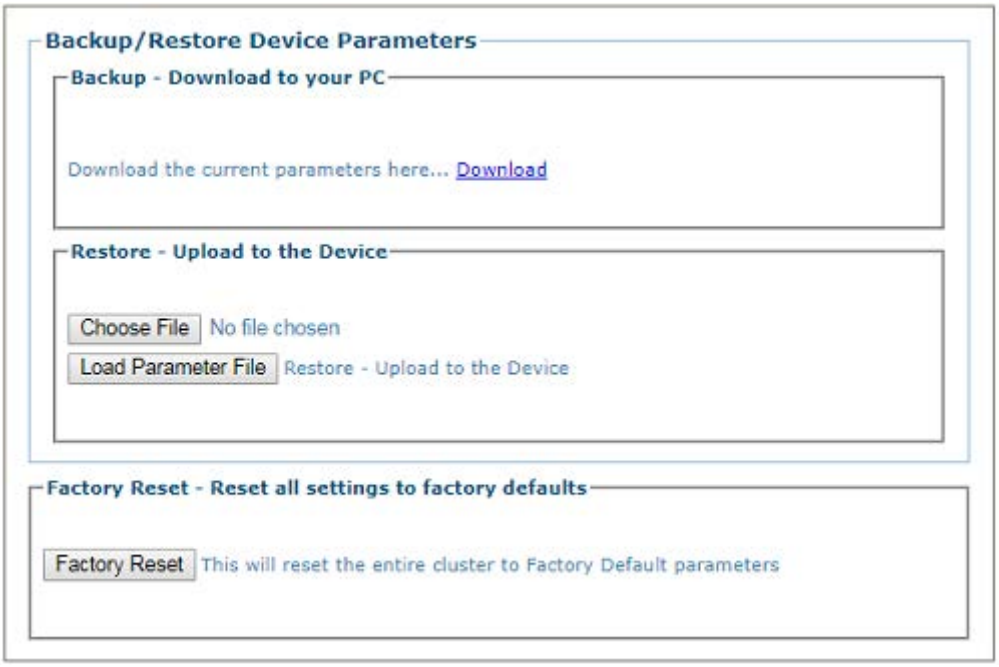
Online	Status	MAC Address	IP Address	Camera Position	Camera Name	Action

Cameras not in this Cluster

Online	Status	MAC Address	IP Address	Action	Name	
		00:0E:13:06:00:6A	192.168.0.198	Ignore this camera	Unknown	Blink

7. You need to load the XML (parameters) file that was retrieved from one of the other cameras in the tunnel

8. Access **Utilities | Backup/Restore Device Parameters**.



9. Click **Choose File** to locate the XML you saved previously.

10. Click **Load Parameter File** to upload the XML file to the replaced camera.

11. Once the parameter file has been uploaded, power down the AV7000.

12. Remove the Controller Key.

13. Reconnect the sync network cables.

14. Re-apply power to the AV7000.

15. The AV7000 should now be restored in this Cluster.

CHAPTER 10
TECHNICAL FEATURES

This chapter provides detailed specifications for the AV7000 Barcode Reading Systems. It provides specific information on:

- Electrical Features
- Optical Features
- Reading Features
- Human Machine Interface
- Software Features
- Environmental Features
- Physical Features

ELECTRICAL FEATURES			
Supply Voltage	23-26VDC at illumination connector		
Power Consumption	24 VDC ± 2% at power supply connector		
AV7000 Camera	4A		
Illumination Color:	Red	White	
AV7000 Camera + AI7000-800 Illumination	12A	15.3A	
AV7000 Camera + AI7000-1100 Illumination	16.5A	20A	
AV7000 Camera + AI7000-1500 Illumination	20A	22A	
Electrical Protection	Internal Electronic Polarity Inversion Protection for both AV7000 cameras and AV7000 illuminators		

Common Communication Interfaces	Main	Baud Rate
	RS232/RS422 up to 115.2 Kbit/s	1200 to 115200
	Auxiliary	
	RS232 up to 115.2 Kbit/s	1200 to 115200
	Ethernet	2 x Ethernet TCP/IP 1 Ethernet Gigabit for decoding data to Host (may also be used for setup) 1 Ethernet Gigabit for image file transfer to Host
Digital Inputs	3 x Inputs (2 + 1 x "Encoder"), optocoupled, NPN/PNP (5-30 Vdc) 1 Presence Sensor opto-isolated (polarity insensitive) 1 Optical Encoder opto-isolated (polarity insensitive) 1 General Purpose opto-isolated (polarity insensitive)	
Digital Outputs	2 x Outputs SW programmable, optocoupled, event driven, NPN 2 General Purpose opto-isolated open collector or open emitter	
Optional Setup Interface	1 USB 2.0 port for Keyboard/Mouse Hub + 1 VGA port for System Monitor	
Internal Communication System	SyncNet Technology	
Fieldbus	All common Fieldbus communications supported through various Fieldbus modules installed in the CBX800 connection box.	
OPTICAL FEATURES		
Sensor Type	**8K High Speed CMOS Line Scan - 8192 pixels**	
Optical Lens	90 mm, 110 mm and 140 mm *	
View Angle	8° to 45° *	
Max Scan Rate	30 kHz scans/sec	
FOV from Top	up to 1400 mm *	
DOF from Top	up to 1200 mm *	
Resolution	110 to 260 pixels/inch (DPI) *	
Focus	Dynamic	
Sensor Type	**12K High Speed CMOS Line Scan - 8192 pixels**	
Optical Lens	80mm, 100mm, 120mm	
View Angle	15° to 45° *	
Max Scan Rate	40 kHz Scans/sec	
FOV from Top	up to 1600 mm *	

DOF from Top		up to 1200 mm *				
Resolution		Up to 320 pixels/inch (DPI) *				
Focus		Dynamic				
		* Depends on model and/or application type				
HUMAN MACHINE INTERFACE						
Keypad		2 buttons				
LED Indicators		Status, Tach,Trigger				
HARDWARE FEATURES						
Decoder CPU		Dual-core Intel® Celeron®, optional Intel® Core™ i5				
Operating System		Linux				
RAM		8 Gb				
Parameter Storage		4 Gb Non-volatile internal FLASH				
SOFTWARE FEATURES						
Device Programming		Multilanguage, browser-based, on board HTML web server interface				
Readable Barcodes		All Standard 1D and 2D Symbologies				
ENVIRONMENTAL FEATURES						
Temperature		Operating: 0° to 50° C [32° to 122° F] Storage: -20° to 70° C [-4° to 158° F]				
Relative Humidity		95% non condensing				
Vibration Resistance		SINE vibration as per EN60068-2-6 5-9Hz : 1.5mm / 9-150Hz :0.5g 2h on the primary axis (perpendicular to the face of the camera)				
Shock Resistance		As per EN60068-2-27, 15g / 11ms / 3 times up and 3 times down on the primary axis.				
Protection Class		IP65				
Fan Life		L10 @ 50°C : 50000h				
PHYSICAL FEATURES						
Mechanical Dimensions:						
AV7000 with external fans and Short Illumination		845x416x237 mm [33.3x16.4x9.3 in]				
AV7000 with external fans and Medium Illumination		1150x416x237 mm [45.3x16.4x9.3 in]				
AV7000 with external fans and long Illumination		1480x416x237 mm [58.3x16.4x9.3 in]				
Weight						
AV7000		11 kg [24 lbs]				
Illumination Short, Medium, Long		12 kg [26 lbs], 15 kg [33 lbs], 19 kg [41 lbs]				

Enclosure	Aluminum Alloy
Connections	FAN, I/O, FOCUS SER, POWER, HOST NET, IMAGE NET, FOCUS NET, SYNC OUT, SYNC IN
OTHER	
Service Options	Installation services and on-site training
Warranty	2-year limited, parts and labor

APPENDIX A

ETHERNET IP INTRODUCTION

The AV500/900 camera supports the EtherNet/IP™ Industrial Networking protocol which we will refer to as EIP. EIP simplifies the communication of barcode and Input/Output data with other EIP enabled devices, such as a programmable logic controller (PLC).

Software release 1.4.0.0 and higher for the AV500/900 product line supports the legacy ASI EtherNet/IP™ Object. This mode allows the installation of AV500/900 cameras in systems using PLC programs developed for Axiom, Axiom X, and AL5010 scanners and can also be useful if ControlLogix On-Demand Messaging is desired for an application.

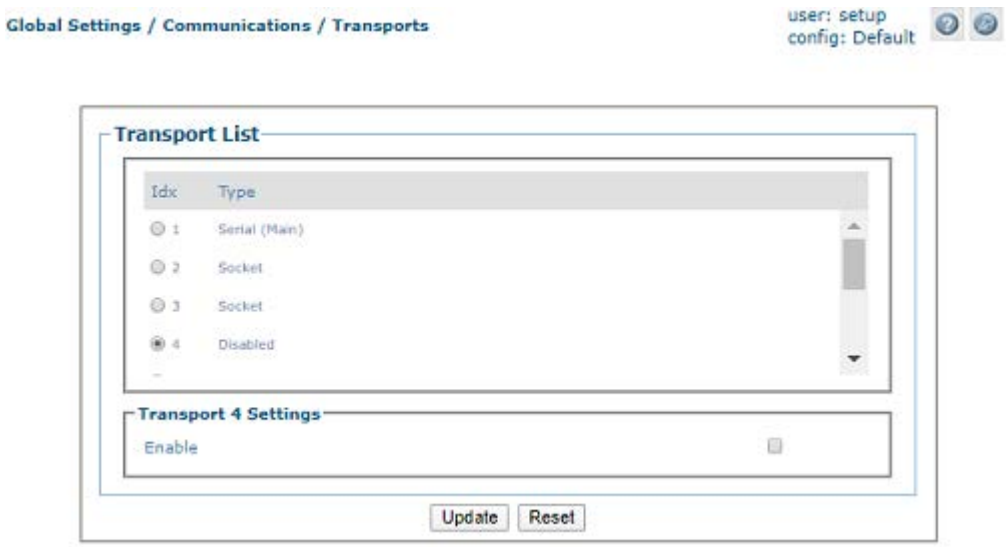
The ASI Object supports all configuration options available on the Axiom, Axiom X, and AL5010 with the exception of the 8 Reader Outputs.

ETHERNET/IP CONFIGURATION IN READER

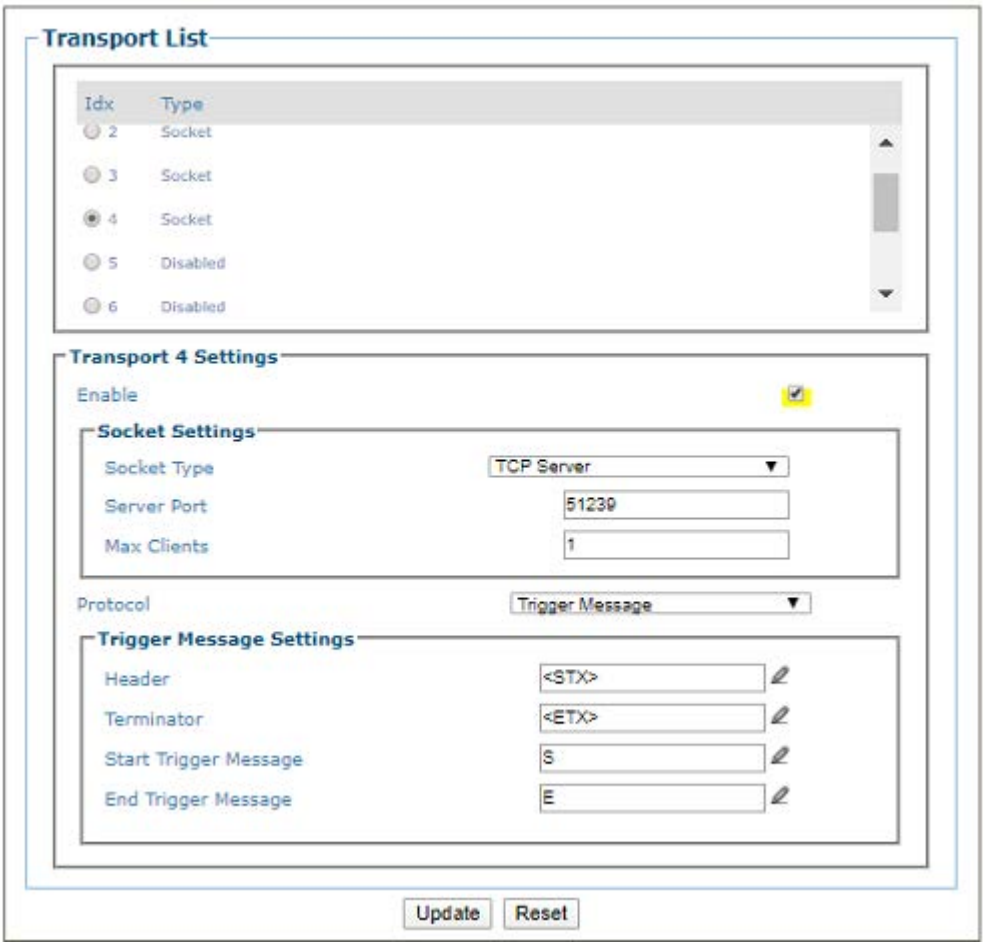
EIP is not enabled by default in the camera.

To enable Ethernet IP follow these steps:

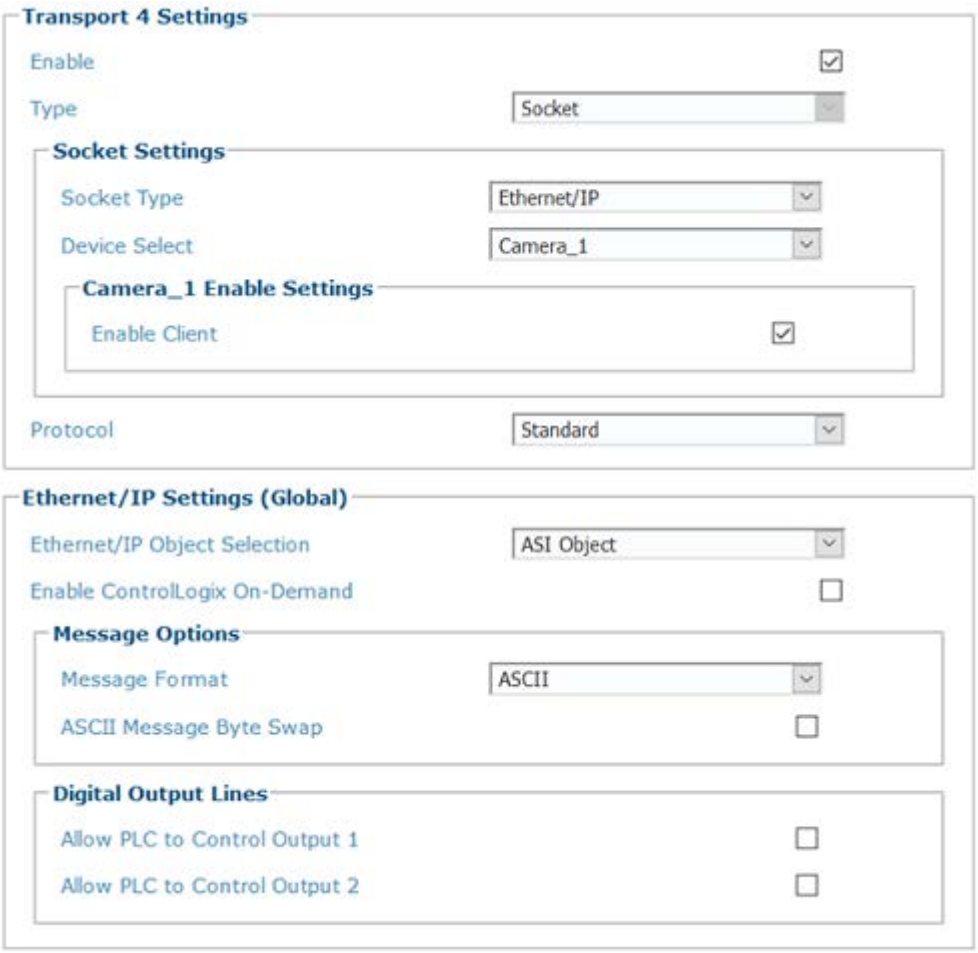
1. In the menu under **Modify Settings / Global Settings / Communications,** click **Transports.** The Transports List window opens.



2. Select the socket for which to **Enable Ethernet/IP**.

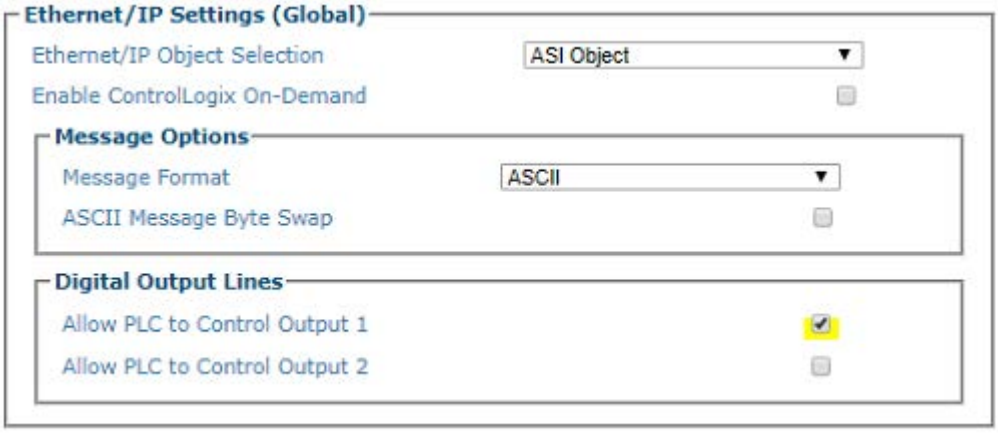


3. Click the **Socket Type** drop-down and select **Ethernet/IP**, various Ethernet options will appear.

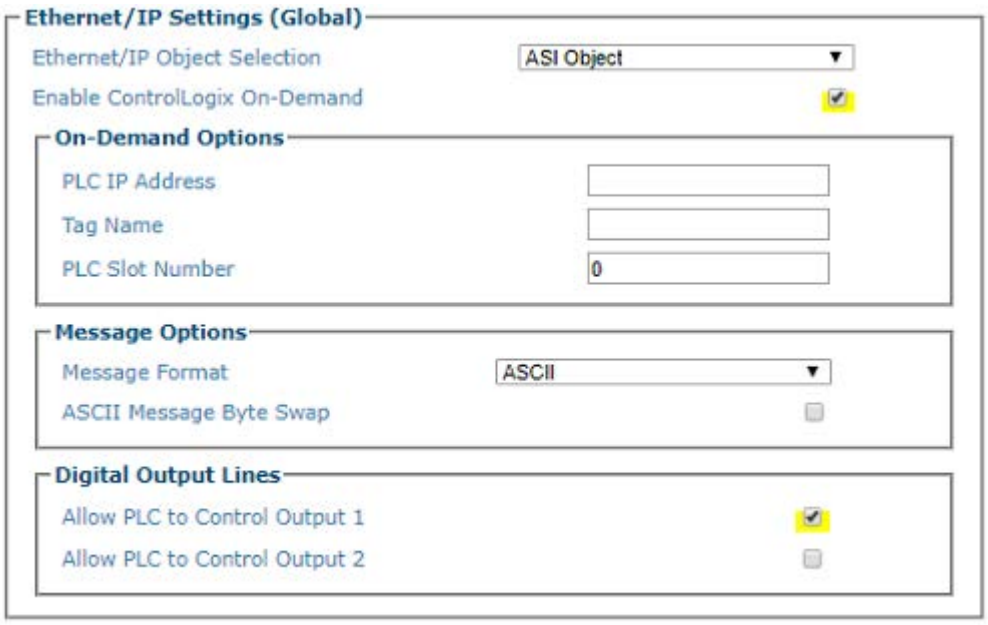


4. Click the check-box to **Enable Client.** Once enabled, EIP allows the camera to communicate with other Ethernet/IP enabled devices. This can be done using **Explicit Messaging, I/O Messaging** and a special protocol for ControlLogix Controllers called **On-Demand Messaging**. The EIP, ASI Object definitions follow.

I/O messaging can be used to monitor and set the cameras I/O bits, and to obtain bar code data from the camera. The disadvantage is that the I/O messages are always sent at a scheduled interval creating a lot of network traffic.



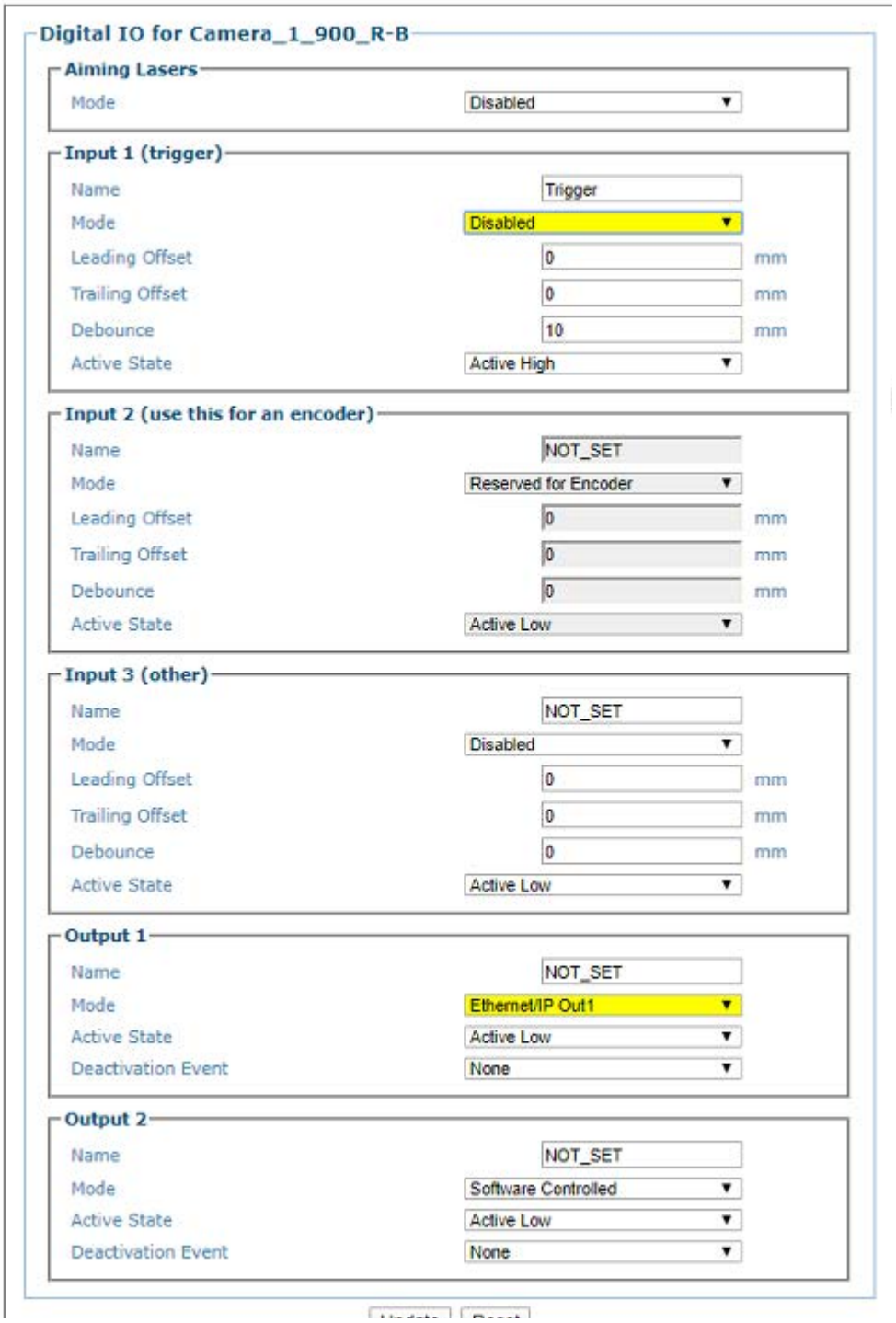
By contrast, **On-Demand Messaging** (which only works with a ControlLogix Controller) allows bar code data to be sent to the Controller only when a bar code is read.



Select the check-box **Enable ControlLogix On-Demand**. This is described in more detail later in this document.

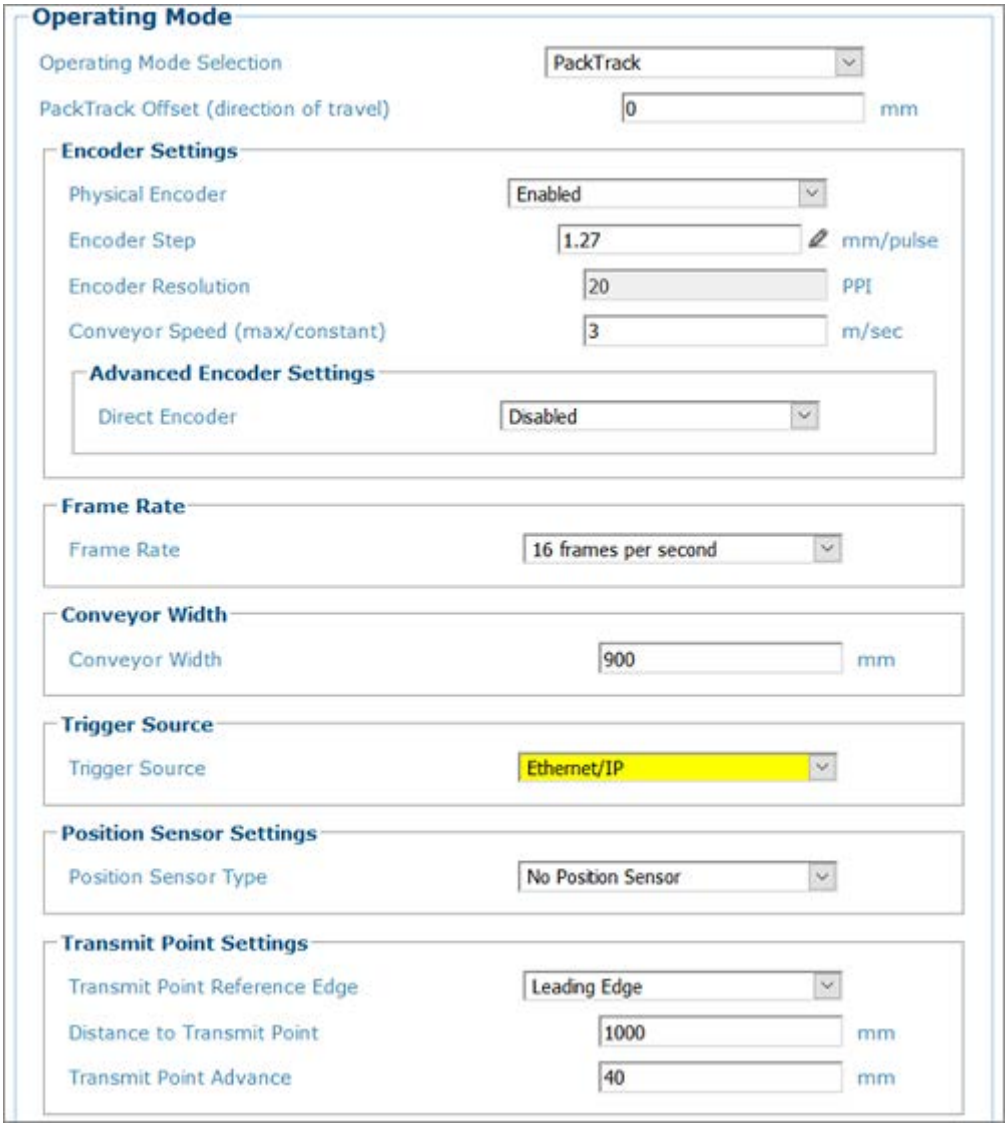
The **Message Format** parameters allow you to manipulate the format of the bar code data. Most notable if your barcodes only contain numeric digits, you can configure the reader to convert the bar codes to a numeric value instead of transmitting them as ASCII text.

The **Digital Output Lines** parameter can be used to relinquish control of the internal relays (2 relays for AV500/900). When this has been done, these relays are controlled by bits within the Output Word.



Lastly, When EIP is enabled, the option **Start Input From Bus** becomes available on the Operating Mode page of e-Genius.

When this is enabled, the camera trigger input is ignored and the reader will be triggered solely by manipulating the Trigger Bit in the Output Word (contained in the reader Assembly and Output Objects).



I/O CONTROLLOGIX MESSAGING EXAMPLE

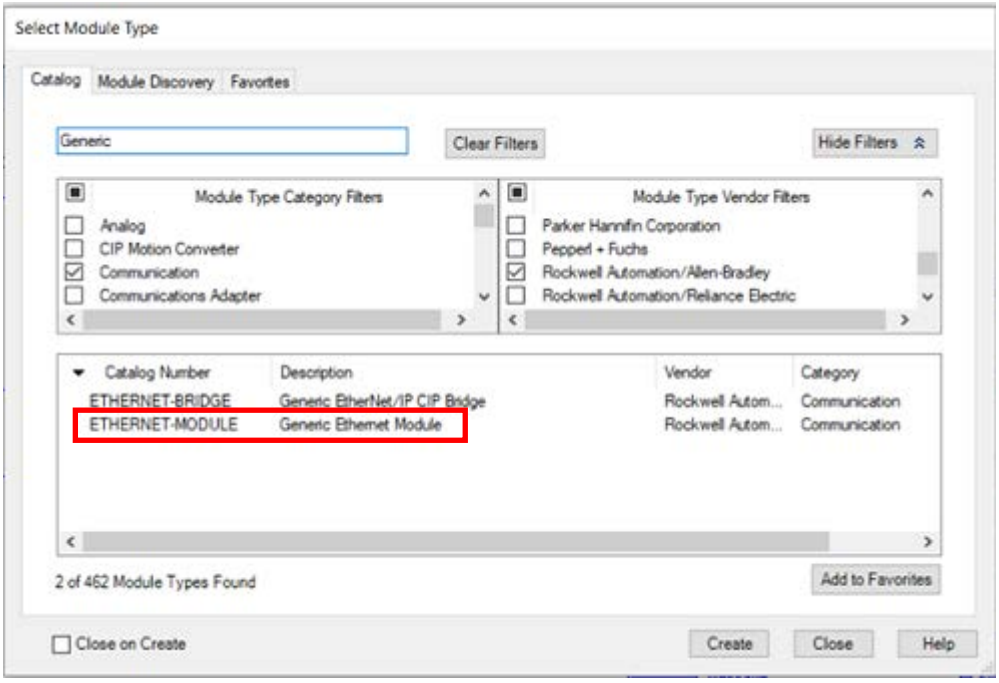
The following example illustrates how a camera can be configured to communicate with a ControlLogix processor using I/O messaging. Using this information along with the Reader Object definitions later in this document, it should be possible to adapt these directions for other EtherNet/IP network master devices.

When EtherNet/IP is enabled on the camera, EIP I/O Messaging is automatically enabled. No further configuration on the Datalogic device is needed to setup I/O messaging. Since the ControlLogix processor now treats the camera as an I/O device, to setup an EIP I/O message transfer between a camera and a ControlLogix processor, you need to configure your camera as a **Generic Ethernet Module** in the ControlLogix I/O tree.

Follow these steps to add a module:

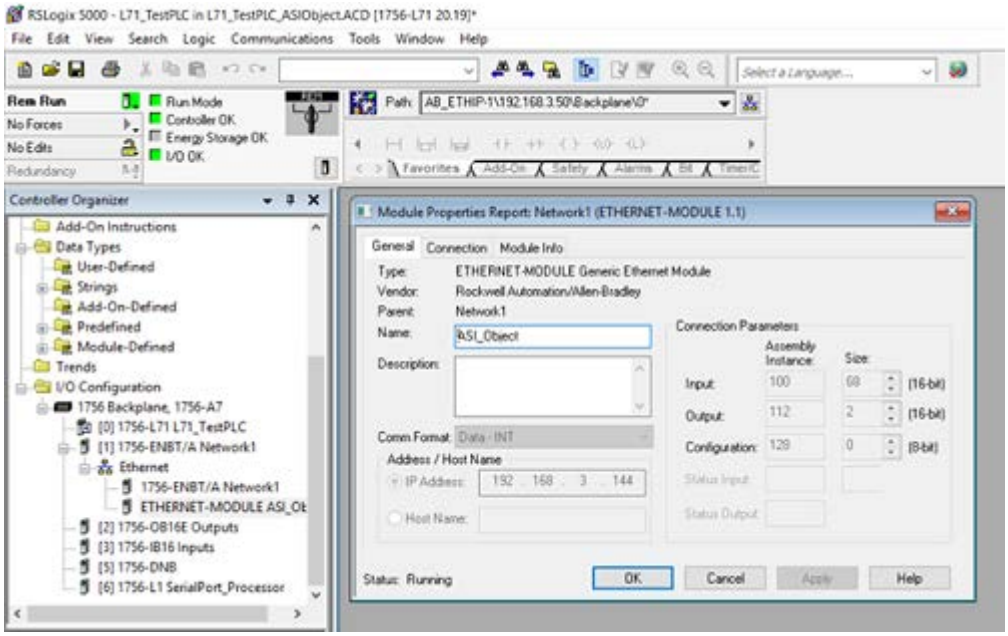
Right click and select **New Module** on the entry for your Ethernet module under the I/O Configuration Tree. A list of options similar to what is shown below will appear.

1. From this list select **ETHERNET-MODULE** for the Generic Ethernet Module.



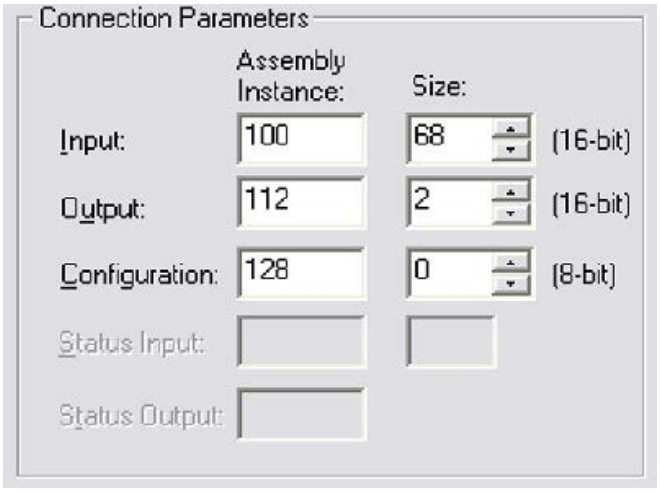
2. Click **OK.**

3. Specify the Properties for your camera. First set the Comm Format to Data-INT. **This must be done first as it cannot be changed later.**

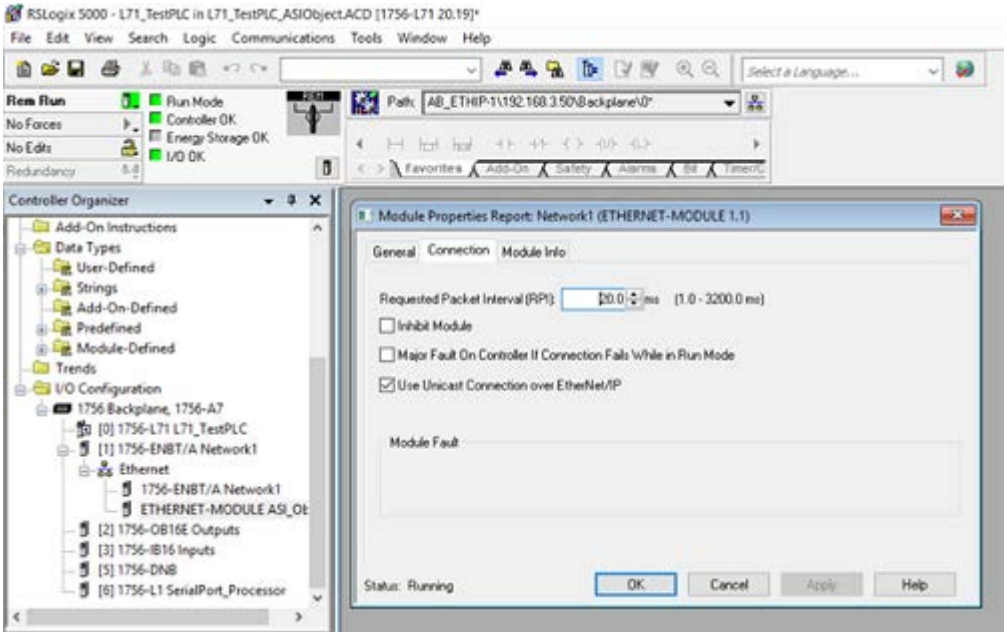


4. Specify the Name, Description and IP address of the camera.

5. Next enter the **Connection Parameters**.



6. You can only “schedule” I/O message transfers to the camera at a fixed interval. Click the **Connection Tab** and specify this interval. The camera will handle intervals down to 20 milliseconds.



7. Click **OK**.

8. After the module definition for the camerar has been completed, tags will be created in the controller based on the name you specified on the properties page for the module. These tags will consist of the name followed either by the letter **“Reader:C Configuration Data” on page 204** the **“Reader:O Output Data” on page 205** or the **“Reader:I Input Data” on page 204**. These tags are based on the reader assembly objects.

Reader:C Configuration Data

This data is not used.

Reader:I Input Data

Tag Name	Value	Description
Reader:I.Data[0]	Discrete Input Word	See bit definitions.
Reader:I.Data[1]	Bar Code Sequence Number	This field is updated every time the bar code data is updated. However, the bar code data will only be updated when the “Last Bar Code Sequence Number” (see Output Data) is set equal to this value.
Reader:I.Data[2]	Bar Code Status	Not currently used.
Reader:I.Data[3]	Bar Code Size (words)	Number of words which contain the barcode data
Reader:I.Data[4-67]	Bar Code Data	

Discrete Input Word

Bit	
0	Unused
1	Unused
2	Unused
3	Unused
4	Unused
5	Unused
6	Unused
7	Unused
8-15	Unused

Reader:O Output Data

Tag Name	Value	Description
Reader:O.Data[0]	Discrete Output Word	See bit definitions.
Reader:O.Data[1]	Last Barcode Sequence Number Received	This field must be updated to match the Bar Code Sequence Number each time the bar code data has been processed.

Discrete Output Word

Bit	Bit = 0	Bit = 1
0*	Trigger Off	Trigger On
1 – 7	Unused	Unused
8*	Reader Relay #1 Off	Reader Relay #1 On
9*	Reader Relay #2 Off	Reader Relay #2 On
10*	Reader Relay #3 Off	Reader Relay #3 On
11*	Reader Relay #4 Off	Reader Relay #4 On
12-15	Unused	Unused

I/O Messaging Ladder Logic Example

The rung of ladder logic below shows an example of how to update the Output data register “Last Barcode Sequence Number Received” after new barcode data is present.

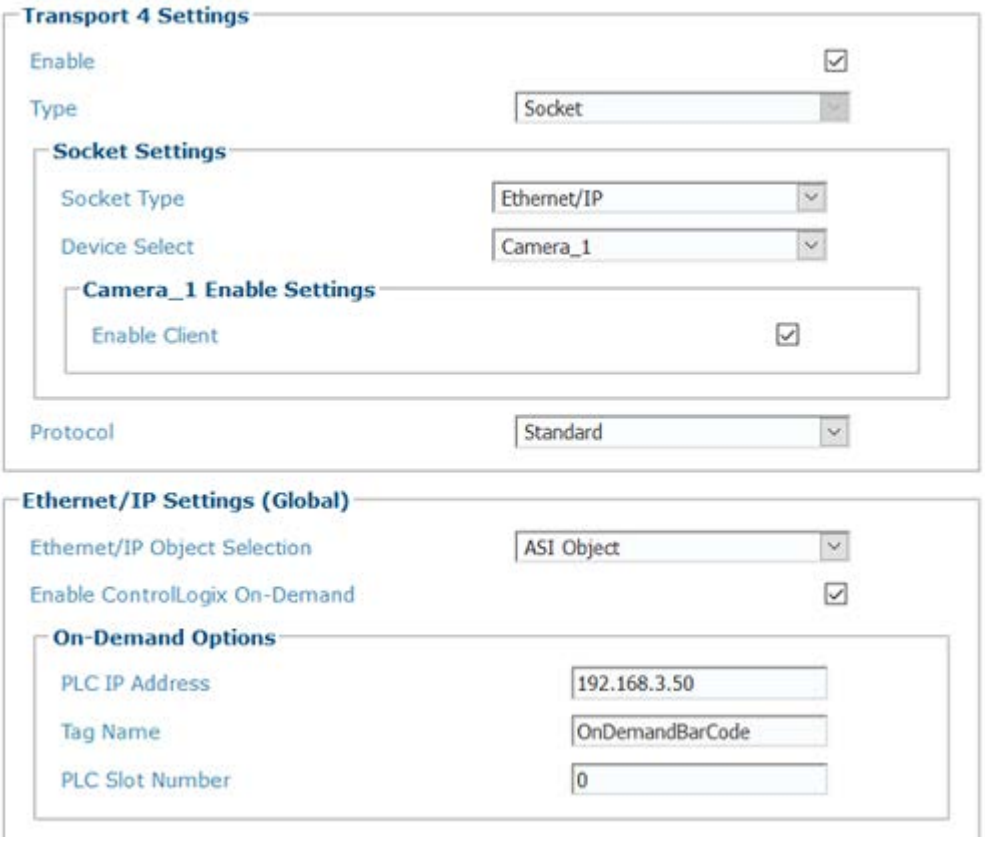
If this logic is not implemented correctly the Input data registers “Bar Code Data” will contain the data from the first read cycle after the reader boots. The **Not Equal To** instruction check for new data to bar code data must be available. When new data is available (output register is not equal to input) the rung is executed.

The **Copy File** instruction copies the bar code data to a program tag. Note that in this example the instruction moves a fixed 10 registers (10 registers will contain 20 ASCII characters).

The **Move** instruction moves the sequence number from the input registers to the output register. This lets the reader know the PLC is ready for the data from the next read cycle.

On-Demand Messaging (ControlLogix)

On-Demand messaging provides another option for transferring bar code data to your ControlLogix processor. With on-demand messaging, the data transfer occurs as soon as the bar code data is available, not as the result of constant messaging at a scheduled interval.



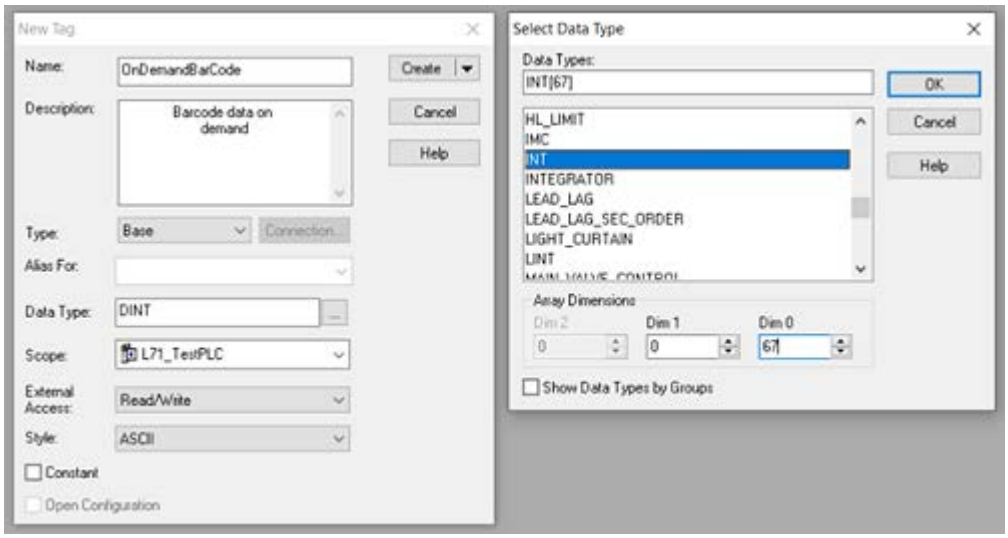
For On-Demand messaging follow these steps:

1. To enable the camera, select the check-box **Enable ControlLogix On-Demand Messaging** from the Ethernet/IP page within e-Genius.

2. Specify the IP address and slot for the ControlLogix processor.

3. Name of the Tag to contain the bar code data.

Once this is complete, you need to define a new Tag in the ControlLogix processor. The new tag must have a type of INT and a dimension of 67 words. The name must match the name specified in the camera Tag Name.



Once this has been completed, these tags will be updated every time a bar code is read.

On-Demand Tag

Tag Name	Value	Description
ReaderTag.Data[0]	Bar Code Sequence Number	This field is incremented every time the bar code data is updated.
ReaderTag.Data[1]	Bar Code Status	Not currently used.
ReaderTag.Data[2]	Bar Code Size (words)	Number of words which contain the barcode data
ReaderTag.Data[3-66]	Bar Code Data	

ETHERNET/IP OBJECT MODELS

This is a description of the different data types that are used in the documentation of the object model. These are standard definitions of the Open DeviceNet Vendor Association (ODVA).

Summary of Objects

The following standard objects are supported. More details can be found in the EtherNet/IP™ Specification available from the Open DeviceNet Vendors Association (ODVA).

Identity Object (01_{HEX})

Message Router Object (02_{HEX})

Assembly Object (04HEX)

Connection Manager Object (06 HEX)

TCP Object (F5HEX)

Ethernet Link Object (F6 HEX)

The following Vendor Specific Objects have been defined to support the Reader Bar Code Reader:

- Barcode Data Object (70 HEX)
- Discrete Input Data Object (71 HEX)
- Discrete Output Data Object (72 HEX)

Definitions

The following table has a description of all of the data types used.

USINT	Unsigned Short Integer (8-bit)
UINT	Unsigned Integer (16-bit)
UDINT	Unsigned Double Integer (32-bit)
STRING	Character String (1 byte per character)
BYTE	Bit String (8-bits)
WORD	Bit String (16-bits)
DWORD	Bit String (32-bits)

STANDARD OBJECTS

Identity Object (01HEX - 1 Instance)

Class Attributes

Attribute ID	Name	Data Type	Data Value	Access Rule
1	Revision	UINT	1	Get

Instance Attributes

Attribute ID	Name	Data Type	Data Value	Access Rule
1	Vendor Number	UINT	25DEC	Get
2	Device Type 0x00 – Generic	UINT	00HEX	Get
3	Product Code Number	UINT	01	Get
4	Product Major Revision Product Minor Revision	USINT USINT	03 01	Get
5	Status Word (see below for definition)	WORD	See Below	Get
6	Product Serial Number	UDINT	Unique 32 Bit Value	Get
7	Product Name Structure of: Product Name Size Product Name String	UINT USINT[0-32]	15 “Bar Code Reader”	Get

Status Word

Bit	Bit = 0	Bit = 1
0	No I/O Connection	I/O Connection Allocated
1 – 15	Unused	Unused

Common Services

Service Code	Implemented for		Service Name
	Class Level	Instance Level	
0EHEX	Yes	Yes	Get_Attribute_Single
05HEX	No	Yes	Reset

Reset Service Code

Service Code	Class	Instance	Attribute	Description
05HEX	1	1	0	Force software reset
05HEX	1	1	1	Reload factory settings and reset

Message Router Object (02HEX)

This object has no supported attributes.

Assembly Object (04HEX – 4 Instances)

Class Attributes

Attribute ID	Name	Data Type	Data Value	Access Rule
1	Revision	UINT	1	Get
2	Max Instance	UINT	81	Get

Instance 0x64 Attributes (Input Instance 1)

Attribute ID	Name	Data Type	Default Data Value	Access Rule
3	Input Data Structure of: Discrete Input Word (see below) Barcode Sequence Number Barcode Status (reserved) Barcode Size Word Barcode Data [UINT]	UINT UINT UINT UINT UINT [ ] varies (up to 64)	0 0 0 0 0	Get

Discrete Input Word

Bit	
0	Reader Programmable Output #1
1	Reader Programmable Output #2
2	Reader Programmable Output #3
3	Reader Programmable Output #4
4	Reader Programmable Output #5
5	Reader Programmable Output #6
6	Reader Programmable Output #7
7	Reader Programmable Output #8
8-15	Unused

Instance 0x70 Attributes (Output Instance 1)

Attribute ID	Name	Data Type	Default Data Value	Access Rule
3	Output Data Structure of: Discrete Output Word (see below) Last Barcode Seq. Num Received	UINT UINT	0 0	Get / Set

Discrete Output Word

Bit	Bit = 0	Bit = 1
0*	Trigger Off	Trigger On
1 – 7	Unused	Unused
8*	Reader Relay #1 Off	Reader Relay #1 On
9*	Reader Relay #2 Off	Reader Relay #2 On
10*	Reader Relay #3 Off	Reader Relay #3 On
11*	Reader Relay #4 Off	Reader Relay #4 On
12-15	Unused	Unused

Instance 0x80 Attributes (Configuration Instance)

Most I/O clients include a Configuration path when opening an I/O connection to a server. There is no Configuration data needed.

Instance 0x81 Attributes (Heartbeat Instance – Input Only)

This instance allows clients to monitor input data without providing output data.

Common Services

Service Code	Implemented for		Service Name
Class Level		Instance Level	
0EHEX	Yes	Yes	Get_Attribute_Single
10HEX	No	Yes	Set_Attribute_Single

Connection Manager Object (06 HEX)

This object has no attributes.

TCP Object (F5HEX - 1 Instance)

Class Attributes

Attribute ID	Name	Data Type	Data Value	Access Rule
1	Revision	UINT	1	Get

Instance Attributes

Attribute ID	Name	Data Type	Default Data Value	Access Rule
1	Status	DWORD	1	Get
2	Configuration Capability	DWORD	0	Get
3	Configuration Control	DWORD	0	Get
4	Physical Link Object Structure of: Path Size Path	UINT Array Of WORD	2 0x20F6 0x2401	Get
5	Interface Configuration Structure of: IP Address Network Mask Gateway Address Name Server Name Server 2 Domain Name Size Domain Name	UDINT UDINT UDINT UDINT UDINT UINT STRING	0 0 0 0 0 0 0	Get
6	Host Name Structure of: Host Name Size Host Name	UINT STRING	0 0	Get

Common Services

Service Code	Implemented for		Service Name
Class Level		Instance Level	
0EHEX	Yes	Yes	Get_Attribute_Single

Ethernet Link Object (F6 HEX - 1 Instance)

Class Attributes

Attribute ID	Name	Data Type	Data Value	Access Rule
1	Revision	UINT	1	Get

Instance Attributes

Attribute ID	Name	Data Type	Default Data Value	Access Rule
1	Interface Speed	UDINT	100	Get
2	Interface Flags	DWORD	3	Get
3	Physical Address	USINT Array[6]	0	Get

Common Services

Service Code	Implemented for		Service Name
Class Level		Instance Level	
0EHEX	Yes	Yes	Get_Attribute_Sin-gle

VENDOR SPECIFIC OBJECTS

Barcode Data Object (70 HEX - 1 Instance)

Class Attributes

Attribute ID	Name	Data Type	Default Data Value	Access Rule
1	Revision	UINT	1	Get

Instance Attributes

Attribute ID	Name	Data Type	Default Data Value	Access Rule
1	Barcode Sequence Num-ber	UINT	0	Get
2	Barcode Status (reserved)	UINT	0	Get
3	Barcode Data Size	UINT	0	Get
4	Barcode Data	UINT[ ] varies (up to 64)	0	Get
5	Last Barcode Seq. Num Received	UINT	0	Get / Set

Common Services

Service Code	Implemented for		Service Name
Class Level		Instance Level	
0EHEX	Yes	Yes	Get Attribute Single
10HEX	No	Yes	Set Attribute Single

Discrete Input Data Object (71 HEX - 1 Instance)

Class Attributes

Attribute ID	Name	Data Type	Default Data Value	Access Rule
1	Revision	UINT	1	Get

Instance Attributes

Attribute ID	Name	Data Type	Default Data Value	Access Rule
3	Discrete Input Word	UINT	0	Get

Discrete Input Word

Bit	
0	Reader Programmable Output #1
1	Reader Programmable Output #2
2	Reader Programmable Output #3
3	Reader Programmable Output #4
4	Reader Programmable Output #5
5	Reader Programmable Output #6
6	Reader Programmable Output #7
7	Reader Programmable Output #8
8-15	Unused

Common Services

Service Code	Implemented for		Service Name
Class Level		Instance Level	
0EHEX	Yes	Yes	Get Attribute Single

Discrete Output Data Object (72 HEX – 1 Instance)

Class Attributes

Attribute ID	Name	Data Type	Data Value	Access Rule
1	Revision	UINT	1	Get

Instance Attributes

Attribute ID	Name	Data Type	Default Data Value	Access Rule
3	Discrete Output Data	UINT	0	Get / Set

Discrete Output Word

Bit	Bit = 0	Bit = 1
0*	Trigger Off	Trigger On
1 – 7	Unused	Unused
8*	Reader Relay #1 Off	Reader Relay #1 On
9*	Reader Relay #2 Off	Reader Relay #2 On
10*	Reader Relay #3 Off	Reader Relay #3 On
11*	Reader Relay #4 Off	Reader Relay #4 On
12-15	Unused	Unused

Common Services

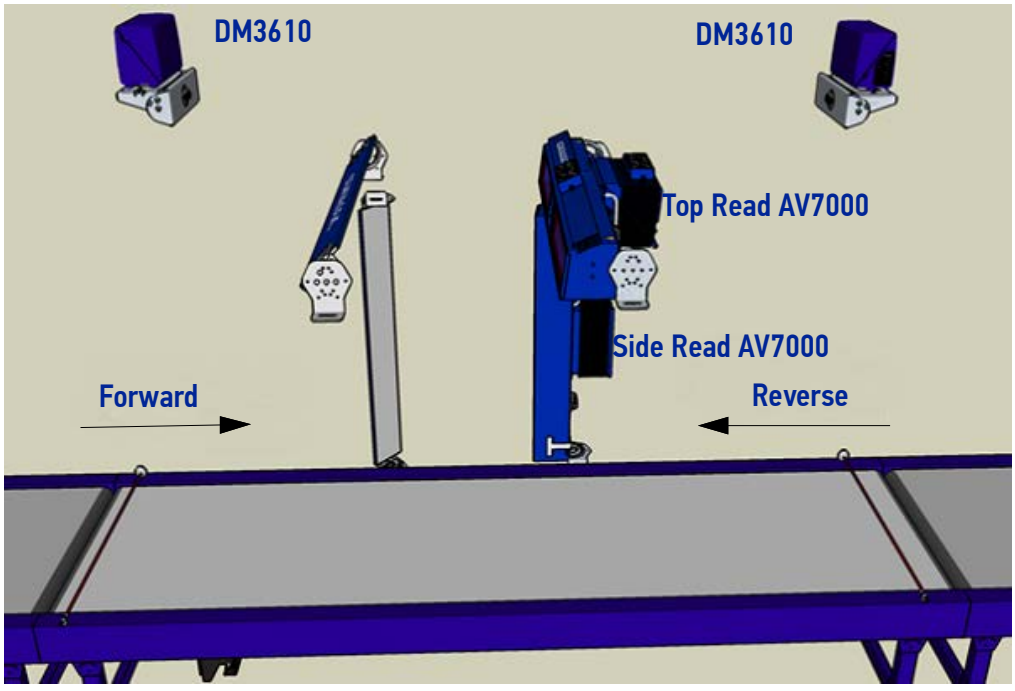
Service Code	Implemented for		Service Name
Class Level		Instance Level	
0EHEX	Yes	Yes	Get_Attribute_Single
10HEX	No	Yes	Set_Attribute_Single

APPENDIX B

MULTIPLE CAMERA BI-DIRECTIONAL SETUP

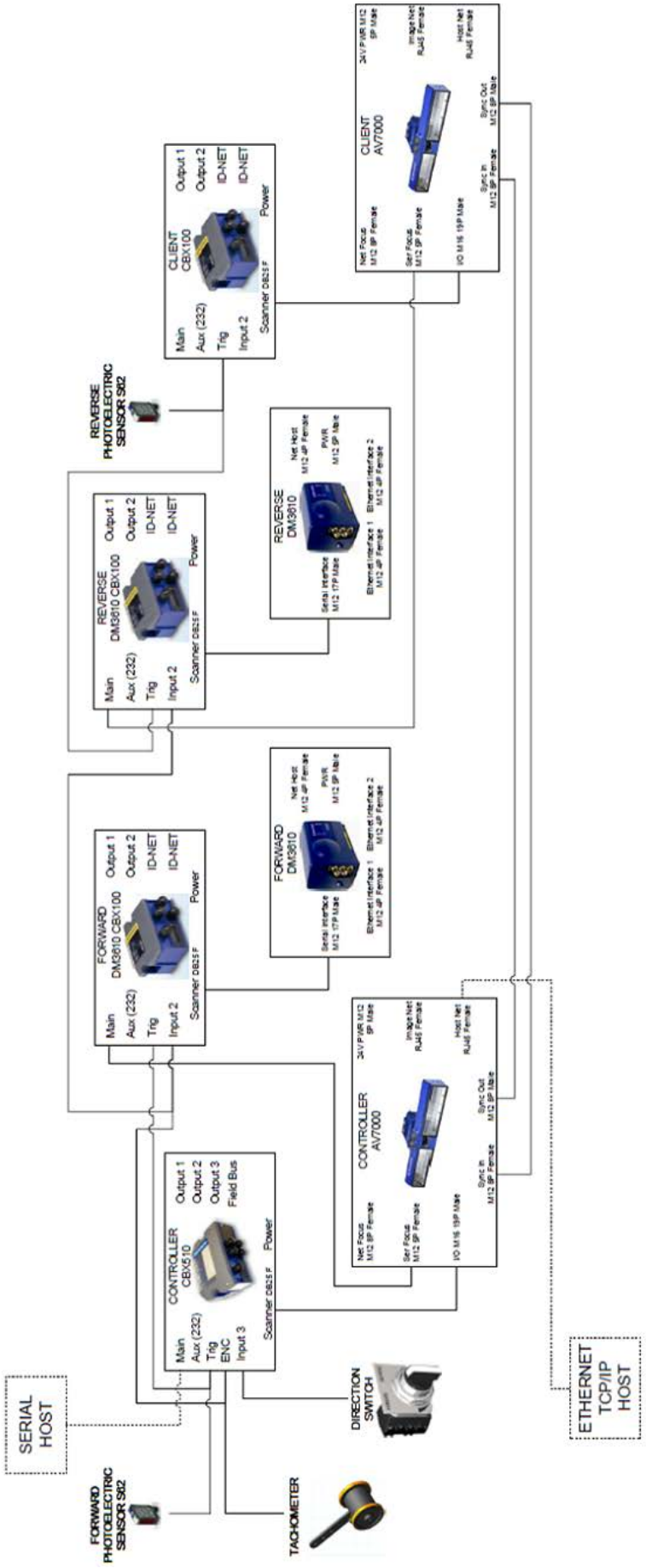
With the release of Software Version 5.0 and higher the AV7000 supports bidirectional conveyor travel. A Datalogic Bidirectional system is an application where you can change the direction of the conveyor. To accommodate a Bidirectional system, an additional photocell is required, as well as other special equipment and software settings as follows:

- Special tachometer bracket to more securely fasten the tachometer to the conveyor
- An additional photocell to signal in the reverse direction
- A customer supplied switch (relay) to indicate to the system in which direction the conveyor is going
- Special bidirectional software settings



Bidirectional System Wiring

Connect your system components as show in the diagram below.



COMPONENTS

The components necessary for a bidirectional system may vary depending on your configuration needs. Listed below are the major components:

- Two AV7000s
  - Configuration application dependent
- Two Position Sensors, which will vary depending on the application.
  - DM3610 - one Forward/one Reverse
  - RangeFinders - one Forward/one Reverse
  - One DM3610 in a defined direction/one RangeFinder in the opposite direction
  - One CBX510 – for the Controller AV7000
  - Three CBX100's (application dependent), one for the client AV7000 and two for the DM3610's if used
  - Two TRIGGER photoeyes - one Forward/one Reverse
- TACHOMETER - with special bracket to accommodate reversing of the conveyor

PREREQUISITES/CONSIDERATIONS

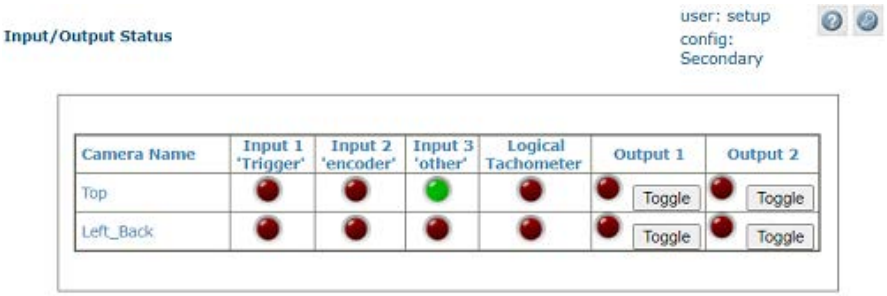
A minimum of two AV7000 units are required to provide the necessary I/O support for a bidirectional system. The tachometer is connected to the Controller AV7000 which distributes the signal to the other AV7000's. The Active Configuration bit (forward/reverse) must be input to the Controller AV7000's CBX box.

A bidirectional system behaves like two unique AV7000 arrays. Set Input 3 on the "Digital IO" page of the AV7000 Controller to "**Indicate Active Configuration"** and the active state to "**Active Low**", the Controlling AV7000 sets the state of the configuration enabling the *Primary* or *Secondary* configuration.

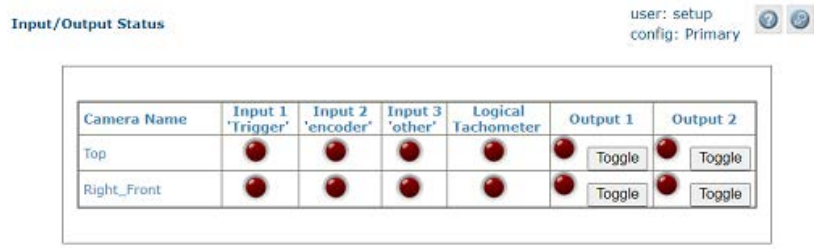
Each configuration has its own unique parameter (XML) file. You provide the state of the Direction bit. It is important to keep this in mind during the application development and installation phases of the project.

NOTE: Keep the state of the Direction bit in mind during application development and installation.

Active state (High) on the selected "Input" (Input 3 LED lights on the Diagnostic/Input/Output Status page) will force "Secondary Configuration."



Inactive state (low) on the selected “Input” (Input 3 LED NOT light on the Diagnostic/ Input/Output Status page) will force “Primary Configuration”



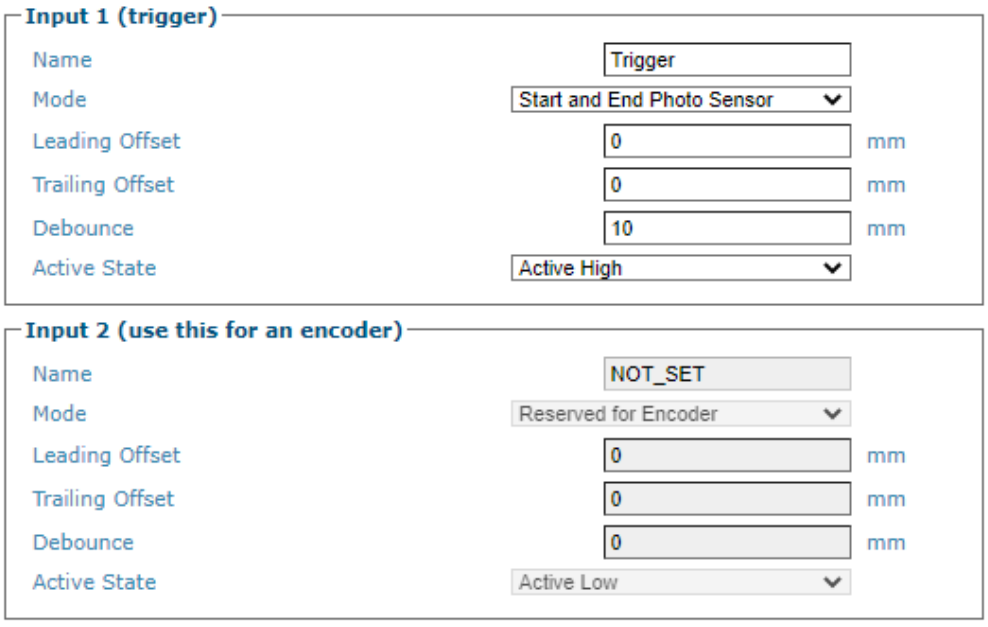
CONFIGURING A BIDIRECTIONAL SYSTEM

Follow these steps to configure a bi?directional system.

1. Add the cameras into the Cluster. See “e-Genius Calibration Presets” on page 89. Verify that the AV7000 camera identified is the Controller (check System Info page, the Controller IP is 192.168.0.145) and it is wired to receive the “Active Configuration” bit from the system (see “Bidirectional System Wiring” on page 217).

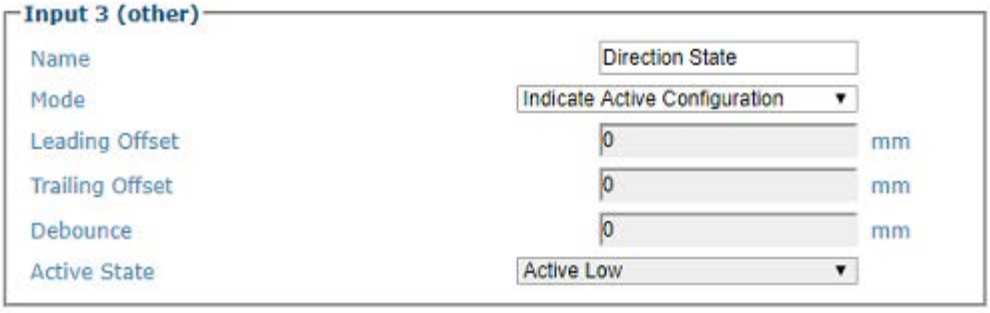
2. Navigate to the **Modify Settings > Device Settings > (controller camera) > Digital I/O**. Set inputs as follows; set Input 1 of the controller camera to be used for Forward Trigger and Input 2 to be used for Encoder.

   NOTE: This applies to the Controller Camera only.



3. Set the Configuration Names as identified below.

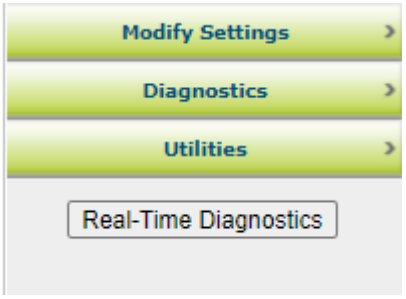
4. Set Input 3 (other) to "**Indicate Active Configuration**". The Active State is automatically set to Active Low.



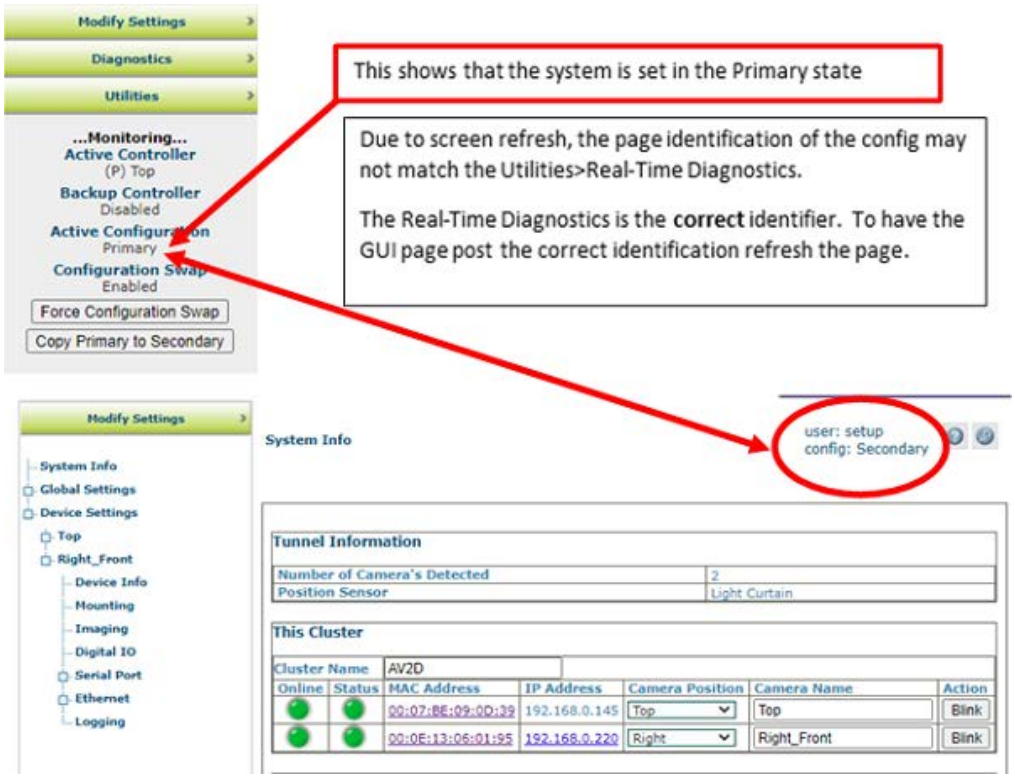
When you have finished making changes, click **Update** to save.

5. Change the direction input to the camera to Primary. This is identified under the Utilities menu option.

6. Enable Real-Time Diagnostics. Click on the **Real-Time Diagnostics** button.



This may take a little while, once the AV7000 completes the change the **Force Configuration Swap** and **Copy Primary to Secondary** texts goes from gray to black.



7. Set all application parameters as you normally do:
   - •Bar Codes
   - •Communication ports
   - •Host messages, etc

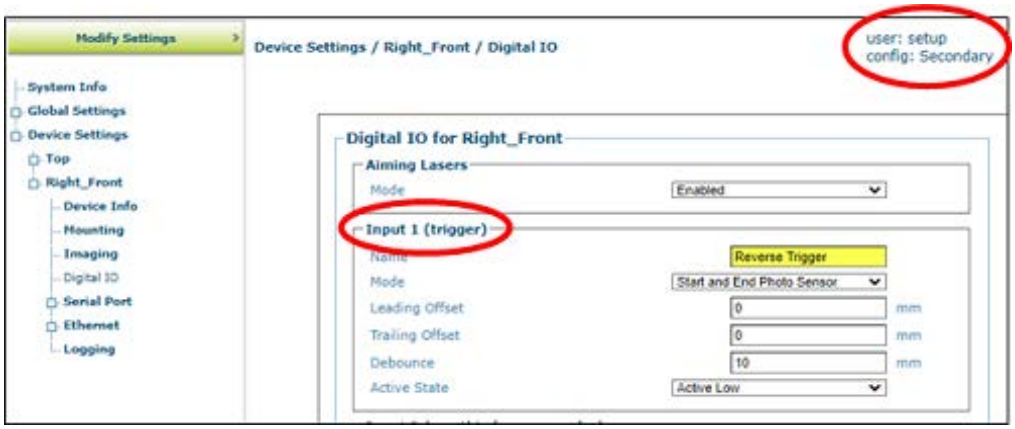
8. PackTrack both AV7000 cameras. The AV7000's will. You will need to configure Packtrack settings first in the primary configuration and then in the secondary configuration, which will be performed in a later step in this document.

9. Switch from the Primary to Secondary state by toggling input 3 of the controller AV7000.

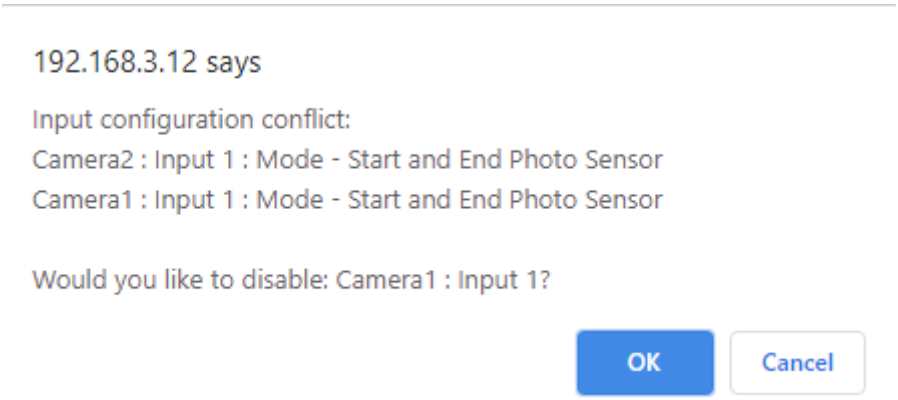
   The first time you switch from primary to secondary state by toggling input 3 of the controller AV7000 the AV7000 will copy all the parameters that have been configured to the secondary XML. This only happens the first time that they are swapped. Anytime after this the AV7000 will change between states and use the independent XML's.

   As previously mentioned, we are now in effect dealing with a new AV7000 system. The I/O used by the Primary configuration is no longer in play (with the exception of the Tachometer signal). The Trigger PE for the Secondary configuration must be processed through one of the Client cameras (see interconnect).

10. Navigate to **Modify Settings > Device Settings > Camera X (Client AV7000 with 2nd CBX box) Digital I/O** page and set the "Trigger" parameters.



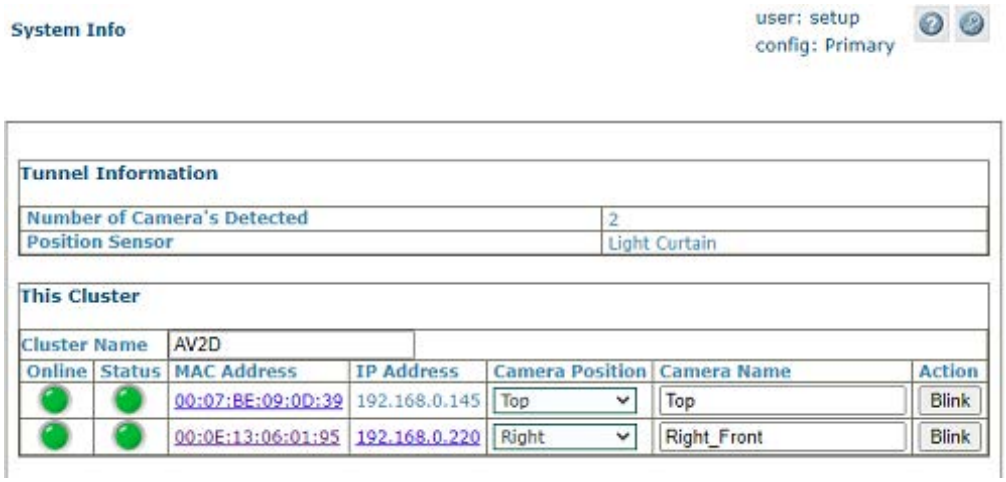
Sometimes an error is received stating that Camera “x” is also set for Trigger. There is a possibility that I/O parameters were copied over when “Active Configuration” was set. If the error appears, click **OK**.



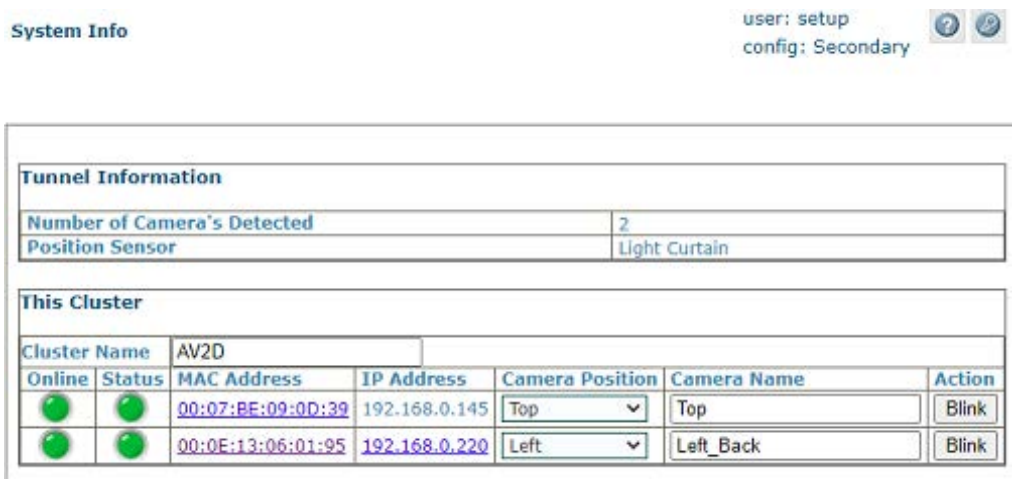
Once Secondary “Trigger” function has been verified calibrate (packtrack) the system as per standard practice. All other parameters were copied from the primary configuration.

11. Since the system is running in the opposite conveyor direction any Camera that was considered a Right-Side mount for the Primary direction of travel is now a Left Side mount for the Secondary. It is necessary to change the Camera Position and Camera Name.

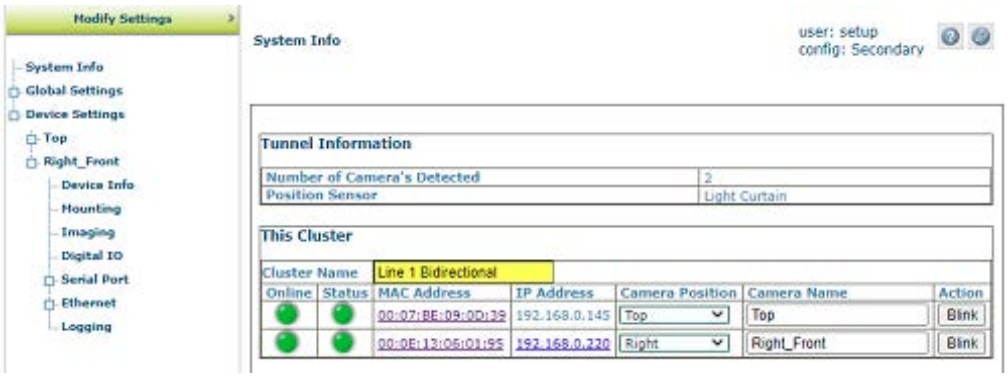
Primary Settings



Secondary Settings



Save the parameter file (XML). This XML file will contain both the parameters from the forward and reversed configuration. It will also be named according to the **Cluster Name** found on the System Info page.



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