

P-Series™

PRODUCT REFERENCE GUIDE



Ultra-compact Smart Camera

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Patents

See www.patents.datalogic.com for patent list.

This product is covered by one or more of the following patents:

Utility patents: EP0996284B1, EP0999514B1, EP1014292B1, EP1128315B1, EP1396811B1, EP1413971B1, JP4435343B2, JP4571258B2, US6512218, US6616039, US6808114, US6997385, US7053954, US7387246, US8058600, US8368000.

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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 website listed on the back cover of this manual.

Manual Conventions

The following conventions are used in this document:

"User" refers to anyone using a P-Series™ camera.

"Camera" refers to the P-Series™ camera.

"You" refers to the System Administrator or Technical Support person using this manual to install, configure, operate, maintain or troubleshoot a P-Series™ camera.

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



NOTE

Notes contain information necessary for properly diagnosing, repairing and operating the camera.



CAUTION

The CAUTION symbol advises you of actions that could damage equipment or property.




WARNING

The WARNING symbol advises you of actions that could result in harm or injury to the person performing the task.

TECHNICAL SUPPORT

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.

Reseller Technical Support

An excellent source for technical assistance and information is an authorized Datalogic reseller. A reseller is acquainted with specific types of businesses, application software, and computer systems and can provide individualized assistance.

All necessary firmware is installed on the P-Series™ camera at the factory. Vision Program Manager (VPM) or Vision Program Manager Lite (VPM Lite) software must be installed to configure the camera inputs, strobe, general purpose outputs, and internal illuminators. Installation software can be downloaded from the Datalogic web site.



NOTE

Throughout this manual, the name “VPM” is used to refer to the software installed on the camera, either full VPM or VPM Lite.

COMPLIANCE

For installation, use and maintenance it is not necessary to open the camera.

Connect Ethernet and dataport connections to a network which has routing only within the plant or building and no routing outside the plant or building.

EAC Compliance

Customs Union:

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

Power Supply

ATTENTION: READ THIS INFORMATION BEFORE INSTALLING THE PRODUCT

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

This product is intended to be connected to a UL Listed Computer (LPS or “Class 2”) which supplies power directly to the camera, or a UL Listed Direct Plug-in Power Unit (rated 10 to 30 V, minimum 1 A) marked LPS or “Class 2.”

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 S.r.l. 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.

Led Safety

LED emission according to EN 62471.

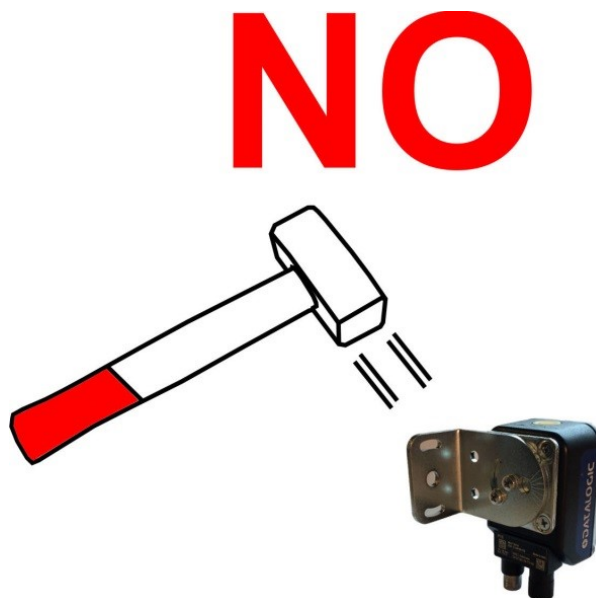
HANDLING

The P-Series™ camera is designed to be used in an industrial environment and is built to withstand vibration and shock when correctly installed. However, it is also a precision product and it must be handled correctly before and during installation to avoid damage.

- Avoid dropping the camera (exceeding shock limits).



- Do not fine tune the position by striking the camera or bracket.



- Do not weld the camera into position. This can cause electrostatic, heat, or imager damage,

NO



- Do not spray paint near the camera. This can cause lens or imager damage.

NO



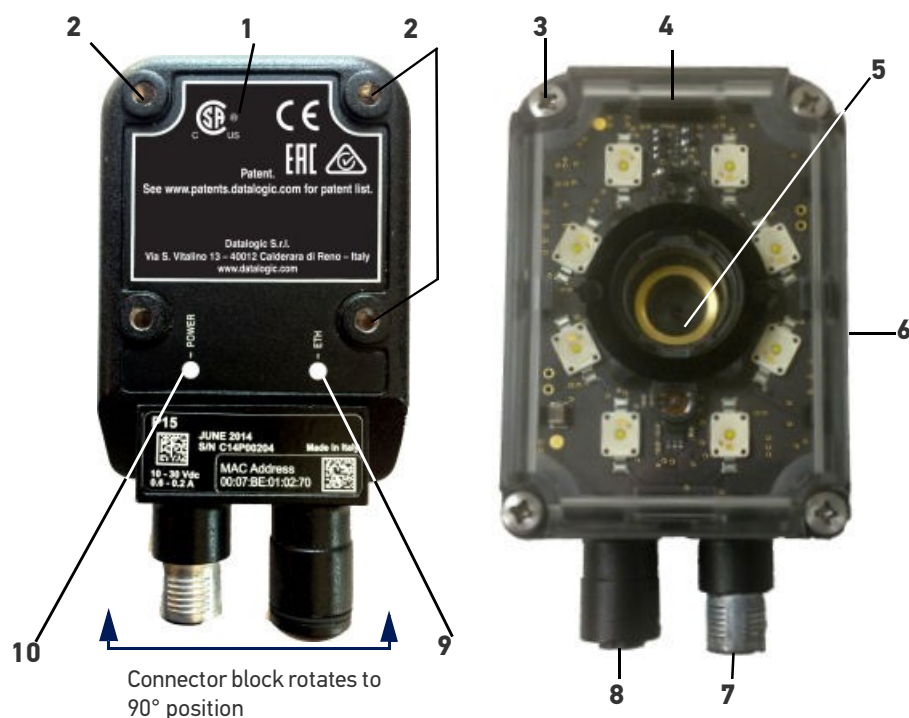
CHAPTER 1

INTRODUCTION

GENERAL VIEW



Disconnect power before removing the cover.



1	Device labels	6	Focus Adjustment Screw (on side)
2	Bracket Mounting Holes (4)	7	Power - Serial Interfaces - I/O Connector
3	Lens Cover Screws (4)	8	Ethernet Connector
4	Lens Cover and Internal Illuminator	9	Ethernet Connection LED
5	Lens	10	Power On LED

Product Description

The P-Series™ cameras are Datalogic industrial compact 2D cameras designed and produced to be a high performance affordable solution for all machine vision applications. Cameras can be licensed to connect to VPM Lite (a limited set of tools) or VPM Full.

- Impact P10: Grey Scale, 640x480, 120 FPS, 1/4" CMOS, VPM Lite license
- Impact P11: Color, 640x480, 120 FPS, 1/4" CMOS, VPM Lite license
- Impact P12: Grey Scale, 640x480, 120 FPS, 1/4" CMOS, VPM Full license
- Impact P14: 1.3 MP, Grey Scale, 1280x1024, 58 FPS, 1/1.8" CMOS, Object Detector Application License Only
- Impact P15: 1.3 MP, Grey Scale, 1280x1024, 58 FPS, 1/1.8" CMOS, VPM Lite license
- Impact P16: 1.3 MP, Color, 1280x1024, 58 FPS, 1/1.8" CMOS, VPM Lite license
- Impact P17: 1.3 MP, Grey Scale, 1280x1024, 58 FPS, 1/1.8" CMOS, VPM Full license
- Impact P19: 1.3 MP, Grey Scale, 1280x1024, 58 FPS, 1/1.8" CMOS, OCR Application License Only

The camera is contained in an aluminum housing. Mechanical dimensions are 95 x 54 x 43 mm and it weighs about 238 g, including the internal illuminator, lens and protective cover.

Electrical connection of Power and I/O signals is provided through an M12 (IP67) 17-pin connector. A standard M12 D-Coded (IP67) Ethernet connector is also present.

Rugged construction, IP67 protection and max 50°C operative temperature make the P-Series™ the ideal product for industrial environments where protection against harsh external conditions is required.

- Cost effective compact Smart Camera Series
- Right-angle IP67 rated enclosure with rotating, sealed connectors
- Embedded interchangeable lenses and illuminators
- Built-in digital I/Os, Serial, and Ethernet interfaces
- A variety of powerful Internal Lighting Systems
- Frame Rate up to 120 frames/sec
- Supply voltage ranges from 10 to 30 Vdc

Applications include:

Automotive

- DPM (Direct Part Marked) Reading and Verification and Tire Sorting

Electronics

- Large PCB Board Tracking and Electronics Product Tracking

Distribution & Retail Industry

- Presentation Scanner, Small Objects Tracking & Sorting, and Warehouse applications

Medical & Pharmaceutical

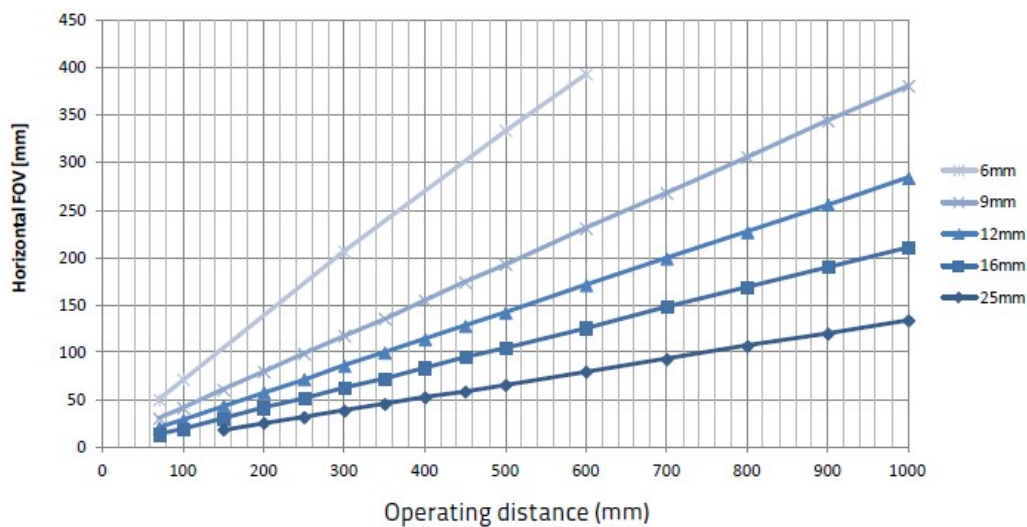
- Medical Devices Traceability, Pharmaceutical and Medicine Manufacturing, and Chemical & Biomedical Analysis

Food & Beverage

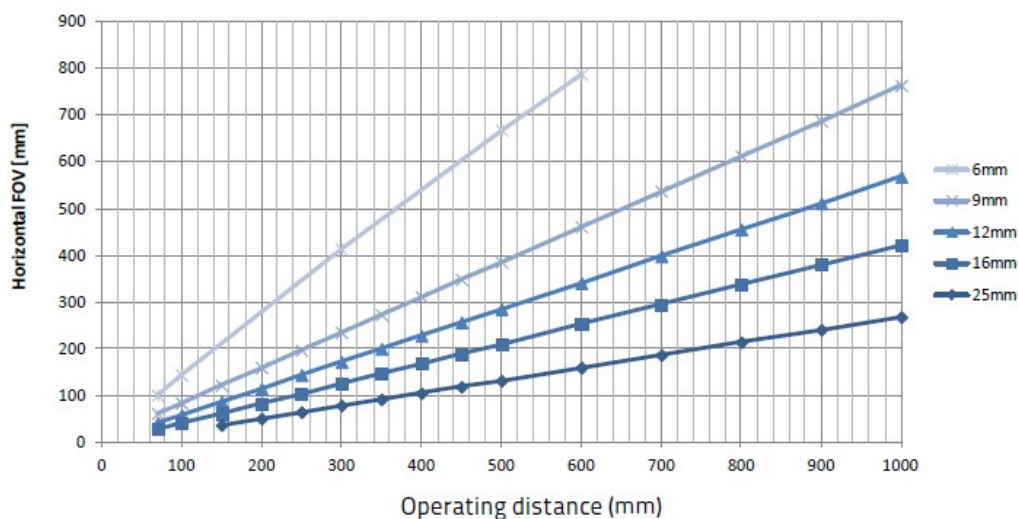
- Work in Progress Traceability and Code Quality Control

The following diagrams list the operating distances for various cameras.

P10, P11, and P12 (640 x 480 pixels)



P14, P15, P16, P17, and P19 (1280 x 1024 pixels)



Indicators and Keypad Button

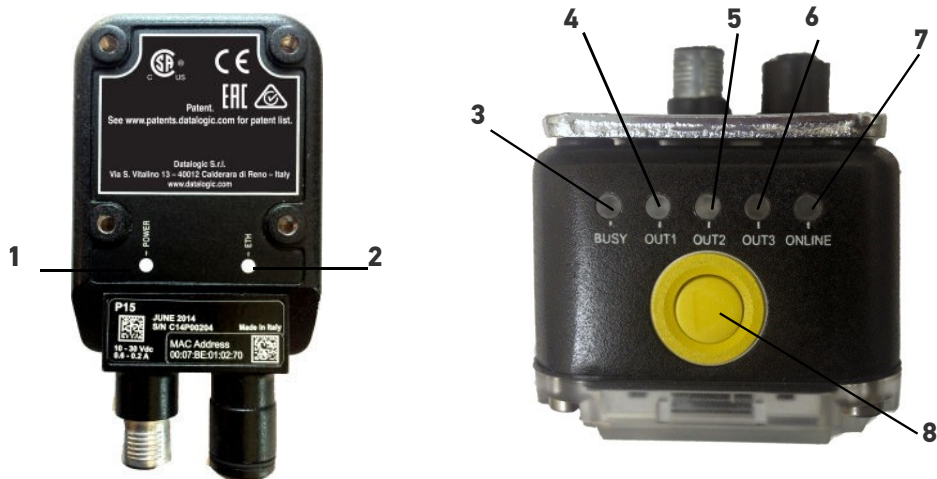


Figure 1- Indicators

The following button and LED indicators are located on the camera.

1	Power	On – camera is connected to power
2	ETH	On – Ethernet link is established. Blinking – data transmission
3	Busy	LED blinks during task execution and flash memory access
4	Out 1	On – Output 1 is on
5	Out 2	On – Output 2 is on
6	Out 3	On – Output 3 is on
7	Online	On – Loaded tasks will be executed based on their trigger parameters
8	Button	Camera Reset: See Note below Camera Button Event: Press and release the button (Internal software event only)

**NOTE**

Camera Reset restores the factory camera settings including deleting all user settings and resetting the camera's Mask and IP Address to the factory default (192.168.0.128).

To Reset the Camera

1. Turn off camera power.
2. Press and hold the Camera Reset button continuously.
3. Turn on power. Continue pressing the Camera Reset button.
4. After about 30 seconds, all the LED indicators turn on for a few seconds. Continue pressing the Camera Reset button.
5. The LED indicators turn off for about five seconds, then turn on.
6. When all the LED indicators have turned on and remain lit, release the Camera Reset button.
7. Wait approximately 30 seconds for the camera to restart.

Lighting System and Lensing Notes

The following table shows the lenses and illuminators that are available. Illuminators are enabled in VPM – Camera Setup.

	FOCAL LENGTH	6MM	9MM	12 MM	16MM	25MM	25 MM WITH IR FILTER
Illuminator Filter							
IR Band pass Filter		YES	YES	YES	YES	NO	NO (already mounted)
YAG Cut Filter		YES	YES	YES	YES	NO	YES
Red Wide Angle		YES	YES	YES	YES	YES	YES
White Wide Angle		YES	YES	YES	YES	YES	YES
Blue Wide Angle		YES	YES	YES	YES	YES	YES

	FOCAL LENGTH	6MM	9MM	12 MM	16MM	25MM	25 MM WITH IR FILTER
IR Wide Angle		YES	YES	YES	YES	YES	YES
Red Multi LED Chain		YES	YES	YES	YES	YES	YES
White Multi LED Chain		YES	YES	YES	YES	YES	YES
Blue Multi LED Chain		YES	YES	YES	YES	YES	YES
Red Wide Angle w/ polarizer		YES	YES	YES	YES	NO	NO
White Wide Angle w/polarizer		YES	YES	YES	YES	NO	NO

Accessories

ACCESSORY	DESCRIPTION	ORDER NO.
Cables		
CAB-DS01-S	M12-IP67 Cable To CBX or QL (1M)	93A050058
CAB-DS03-S	M12-IP67 Cable To CBX or QL (3M)	93A050059
CAB-DS05-S	M12-IP67 Cable To CBX or QL (5M)	93A050060
CAB-DS10-S	M12-IP67 Cable To CBX or QL (10M)	93A051390
CAB-ETH-M01	M12-IP67 Ethernet Cable (1M)	93A051346
CAB-ETH-M03	M12-IP67 Ethernet Cable (3M)	93A051347
CAB-ETH-M05	M12-IP67 Ethernet Cable (5M)	93A051348
CAB-ETH-M10	M12-IP67 Ethernet Cable (10M)	93A051391
Connectivity		
CBX500	Modular Connection Box	93A301068
CBX800	Gateway	93A301077
BM100	Backup Module for CBX500	93ACC1808
BM150	Display Module for CBX500	93ACC1809
Various Fieldbus and Non-Fieldbus Host Interface Modules and All-In-One Connection Box Kits are available		
BM300	Profibus Module	93ACC1810
BM310	Profibus IP65 Module	93ACC1811
BA100	DIN Rail Adapters	93ACC1821
BA200	Bosch Adapters	93ACC1822
Various M12 Panel Connectors for CBX Connection Boxes are available		
License	OCR, Smart Camera	95A906540
Power Supplies		
PG6002	AC/DC Power Supply Unit (US)	93ACC1718
PG6001	AC/DC Power Supply Unit (UK)	93ACC1719
PG6000	AC/DC Power Supply Unit (EU)	93ACC1720
Sensors		
MEP-593	Photocell Kit PNP (PH-1)	93ACC1791
MEP-543	Photocell Kit-NPN	93ACC1728
S3Z-PR-5-C11-PL	Diffuse Proximity Sensor	95B010011

CHAPTER 2

RAPID CONFIGURATION

STEP 1- CONNECT THE SYSTEM

In the typical layout shown in the figure below, an Ethernet host is connected to the camera. The camera can use an external trigger or internal software trigger to signal image acquisition. If an external trigger is used, the Ethernet host connection is needed only for camera and program configuration and inspection monitoring.

The CBX is used to facilitate the connection between the camera, external trigger, and optional input and output devices.

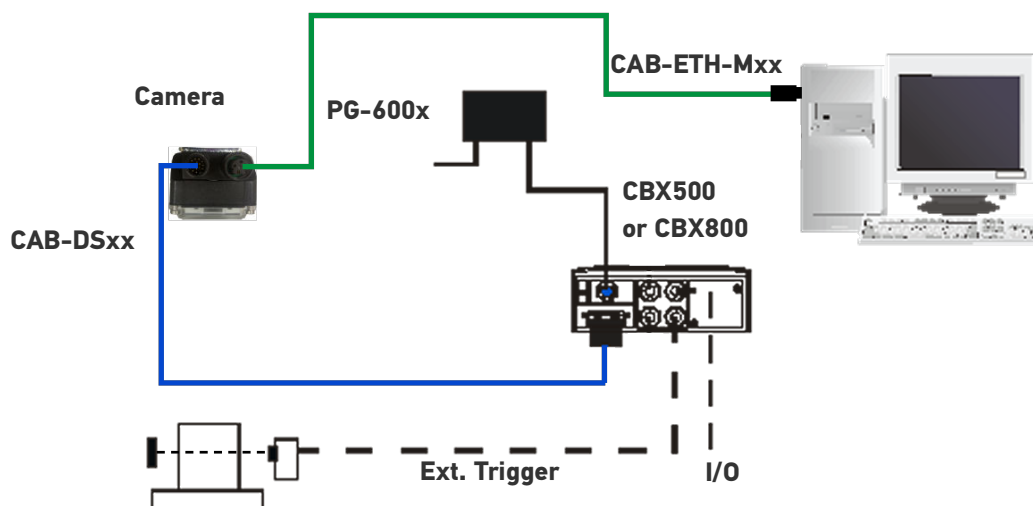


Figure 1- P-Series™™ Stand Alone Layout to Ethernet Host

- **Power Supply Connection**
Use the PG600x AC/DC Power Supply Unit (3 versions for European, UK or US plug).
- **CBX Connection**
Use CAB-DSxx-S between the P-Series™ camera and the CBX for power, external trigger device (photocell), and additional I/O connections.
Use the CAB-ETH-Mxx for the Ethernet connection to the host.



NOTE

The P-Series™ does not support sourcing power towards the CBX in order to power I/O devices. These devices must be powered through the CBX or from an external source.

CBX500/CBX800 Pinout for P-Series™

The table below gives the pinout of the CBX500/CBX800 terminal block connectors. Use this pinout when the P-Series™ camera is connected using the CBX500/CBX800.

CBX500/800 TERMINAL BLOCK CONNECTORS			
Input Power		Outputs	
Vdc	Power Supply Input Voltage +	+V	Power Source - Outputs
GND	Power Supply Input Voltage -	-V	Power reference - Outputs
Earth	Protection Earth Ground	01+	Output 1 +
		01-	Output 1 -
Inputs		02+	Output 2 +
+ V	Power Source -External Trigger	02-	Output 2 -
I1A	External Trigger A (polarity insensitive)	03A	CBX500: Strobe/Output 3 (Single Pin Connection)
I1B	External Trigger B (polarity insensitive)		
- V	Power Reference - External Trigger	03B	CBX500: Not Used
+ V	Power Source - Inputs	03A	CBX800: Strobe + / Output 3+ (Opto-isolated; See Note)
I2A	Input 2 + or - (polarity insensitive)	03B	CBX800: Strobe - / Output 3- (See Note)
I2B	Input 2 + or - (polarity insensitive)	RS232 Interface	
-V	Power Reference - Inputs	TX	Transmit
Shield		RX	Receive
Shield	Network Cable Shield	SNGD	Signal Ground



NOTE

The strobe signal connection is shared with Output 3. If a non-zero value is defined for the external Strobe Pulse Length value (in VPM – Settings – Camera – General), the strobe is active. If the value is zero, Output 3 is active.



CAUTION

Do not connect GND and SGND to different (external) ground references. GND and SGND are internally connected through filtering circuitry which can be permanently damaged if subjected to voltage drops over 0.8 Vdc.

STEP 2 – INSTALL THE LENS AND ILLUMINATOR

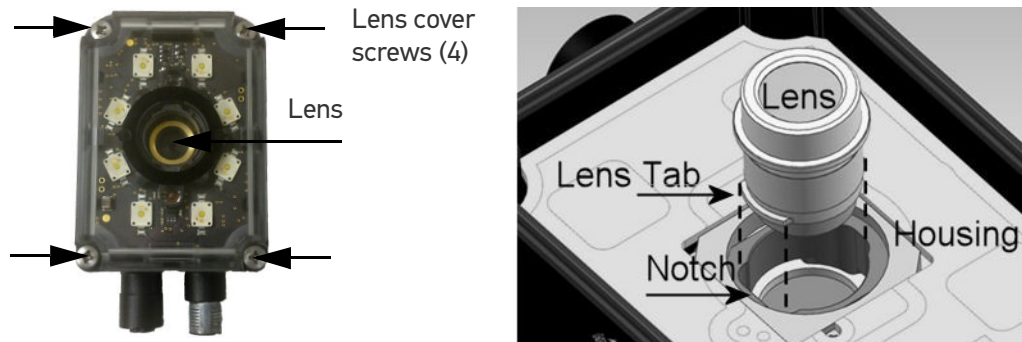
Continue with this step if the camera has no lens or internal illuminator, or you want to use a lens or illuminator with different characteristics.

If the camera already contains the correct lens and illuminator, continue with Step 3.



CAUTION

Disconnect power before removing the cover.



To Remove the Camera Lens

1. Remove the four lens cover screws and carefully remove the cover. Be sure the sealing gasket stays with the cover.
2. Grasp the lens firmly, then press in until the lens stops moving.
3. Turn the lens 90° counter-clockwise.
4. Lift the lens straight up until it clears the lens housing.

To Replace the Camera Lens

1. Align the tabs on the lens with the notches in the lens housing.
2. Grasp the lens firmly, then press in until the lens stops moving.
3. Turn the lens 90° clockwise.
4. Release the lens.
5. When the lens is mounted correctly, it should not turn in the housing.
6. Carefully replace the cover. Be sure the sealing gasket fits into the grooves in the camera body.
7. Replace the four cover screws. Over tightening can damage the cover.

To Replace the Internal Illuminator

1. Remove the four lens cover screws and carefully remove the illuminator and cover. The illuminator is integrated with the cover.
2. Be sure the sealing gasket remains with the cover.
3. Align the new illuminator with the camera case and gently press down until the illuminator is tight to the case.
4. Replace the four cover screws. Overtightening can damage the cover.



NOTE

Configure an Internal Illuminator in VPM - Camera Setup (See “Startup” on page 36.)

To Remove the Optional Lens Filter

1. Remove the four cover screws and carefully remove the illuminator and cover. (See Lens Replacement) The illuminator is integrated with the cover.

2. Gently squeeze the clips on each side of the filter while you gently pull straight up from the illuminator.

To Replace the Optional Lens Filter

1. Line up the clips on the filter with the notches in the illuminator.
2. Gently squeeze the clips on each side of the filter while you gently press straight down on the filter.

STEP 3 – MOUNT AND POSITION THE CAMERA

Use the P-Series™ mounting brackets to obtain the most suitable position for the camera. The most common mounting configuration is shown in the figure below.

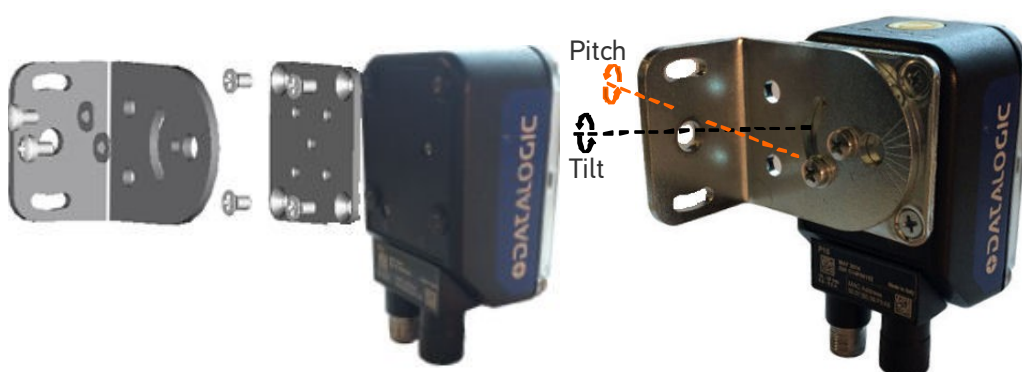


Figure 2- Positioning with Mounting Bracket

When mounting the camera, take into consideration that significant pitch, skew, or tilt may degrade accuracy

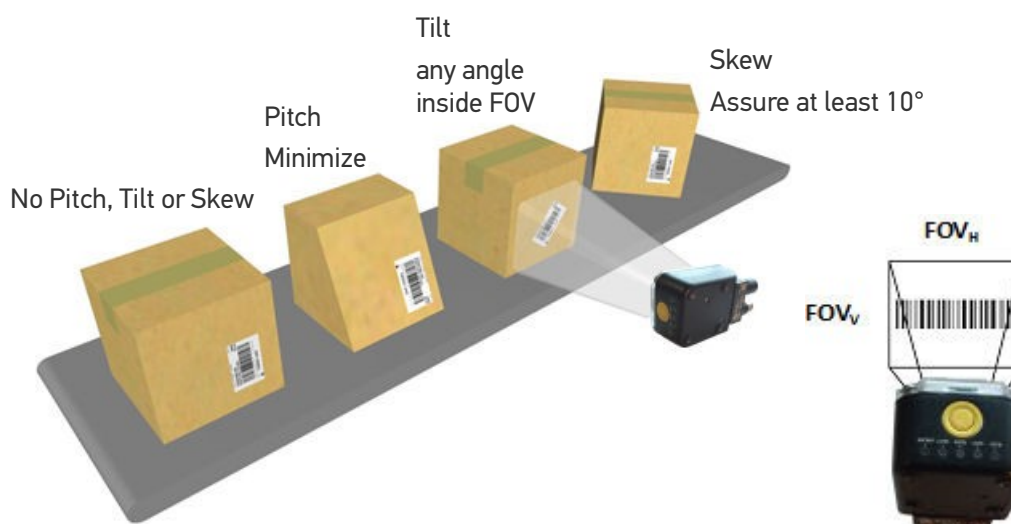


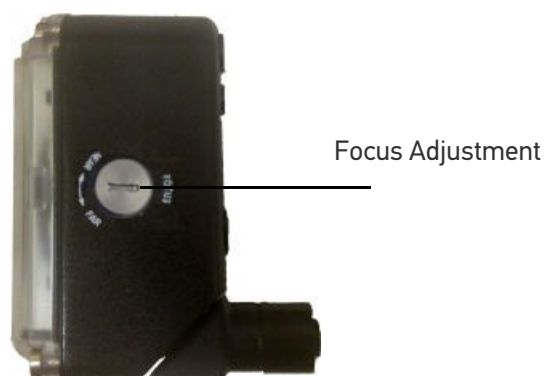
Figure 3- Pitch, Tilt and Skew Angles

STEP 4 – FOCUS THE CAMERA

To adjust the P-Series™ lens, use VPM to continuously snap and display an image. Use the camera Focus adjustment on the side of the camera to adjust the focus.

1. Install or change the lens, if necessary. (See “STEP 2 – Install the lens and illuminator” on page 7.)

2. Power the camera on. The “POWER ON” LED (blue) on the rear of the camera indicates that the camera is correctly powered.
3. Start Impact VPM and connect to the camera.
4. Direct the camera toward a correctly lighted calibration image or other clearly defined object.
5. Select the Settings tab, then click the Camera system object.
6. In the Camera Setup tab, click the Live button.
7. Adjust the lens until the image is clearly in focus in the VPM image window. Turn the Focus Adjustment clockwise to focus on near objects. Turn it counter-clockwise to focus on objects that are further away.
8. When focusing is complete, click the Snap button in the Camera Setup tab. You can now calibrate the camera, if needed.



STEP 5 – CALIBRATE IMAGE DENSITY

In order to function correctly when inspecting images, the camera needs the image resolution or PPI (pixels per inch). Calibration insures that the measurements indicated in VPM tools accurately relate the inspected object's measurements.

There are several methods available for calibrating the camera. Refer to the Calibration Panel section of the Impact Reference Guide for complete details.

CHAPTER 3

INSTALLATION

PACKAGE CONTENTS

Verify that the P-Series™ camera and all the parts supplied with the equipment are present and intact when opening the packaging; the list of parts includes:

1. P-Series™ camera
2. Quick Reference Guide
3. Mounting Kit
 - Mounting Screws (4 + 2)
 - Washers (2)
 - Mounting Brackets (2)

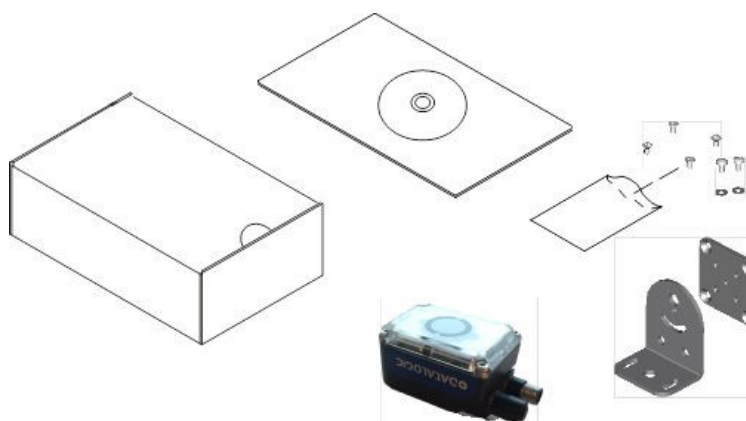


Figure 1- Package Contents

MECHANICAL DIMENSIONS

The P-Series™ cameras can be installed to operate in different positions. The twelve screw holes (M4 x 5) on the body of the camera are for mounting the camera to a mechanical fixture or the provided brackets. (Figure 2).

The diagram below gives the overall dimensions of the camera and may be used for its installation.

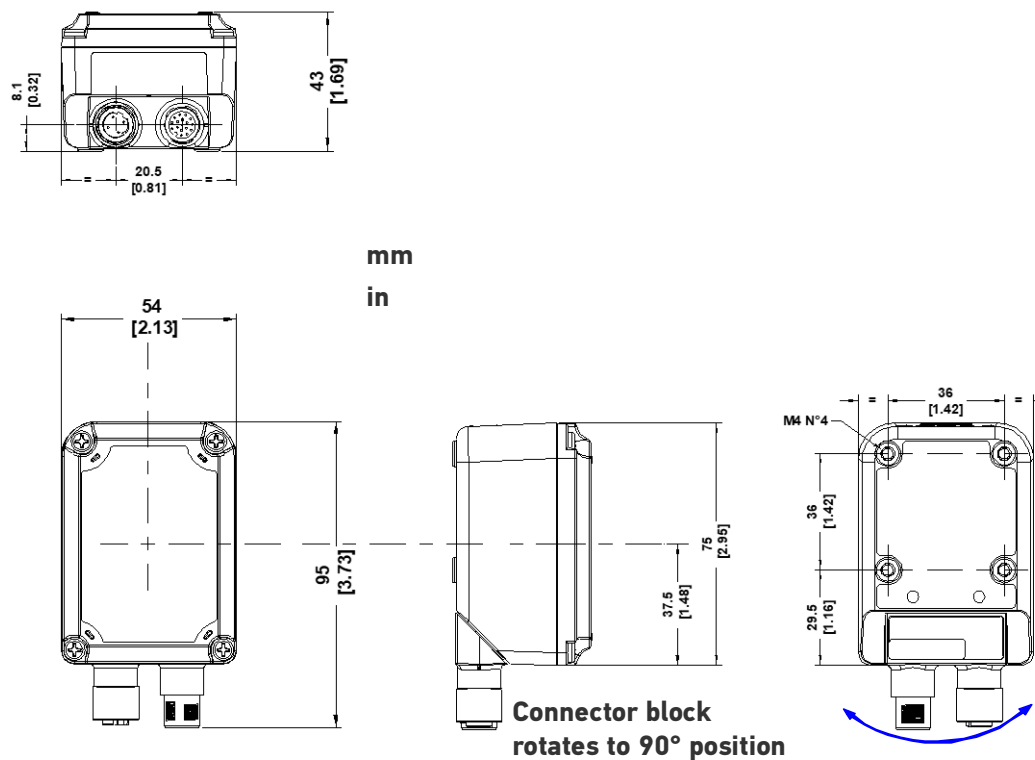


Figure 2- Overall Dimensions with Connector at 0°

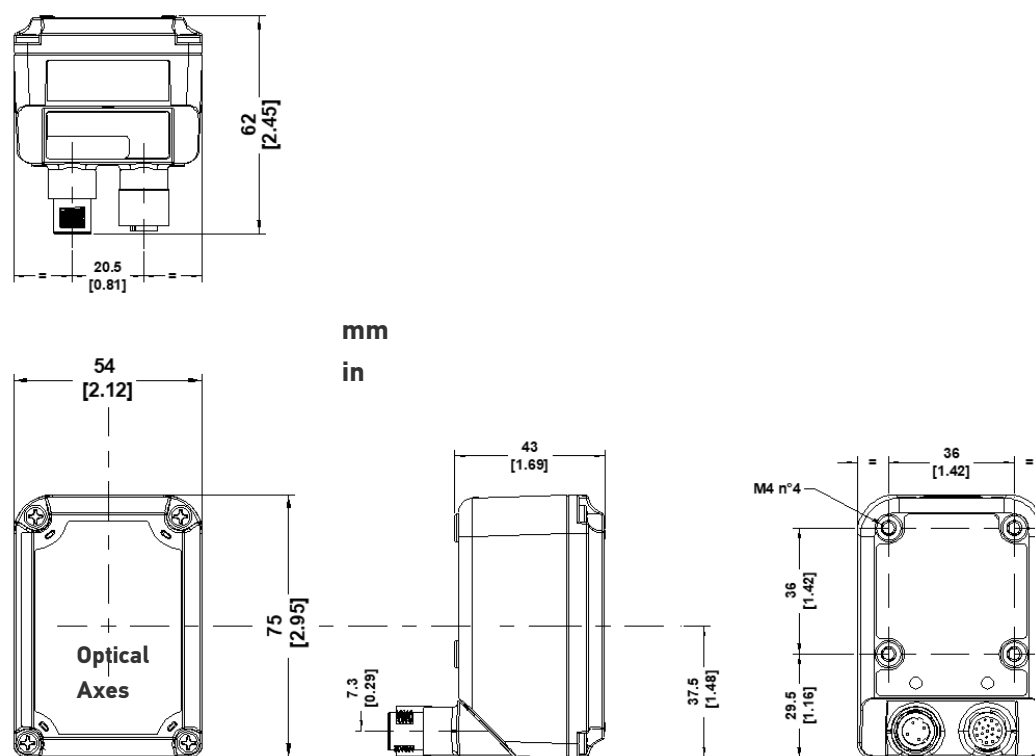


Figure 3 - Overall Dimensions with Connector at 90°

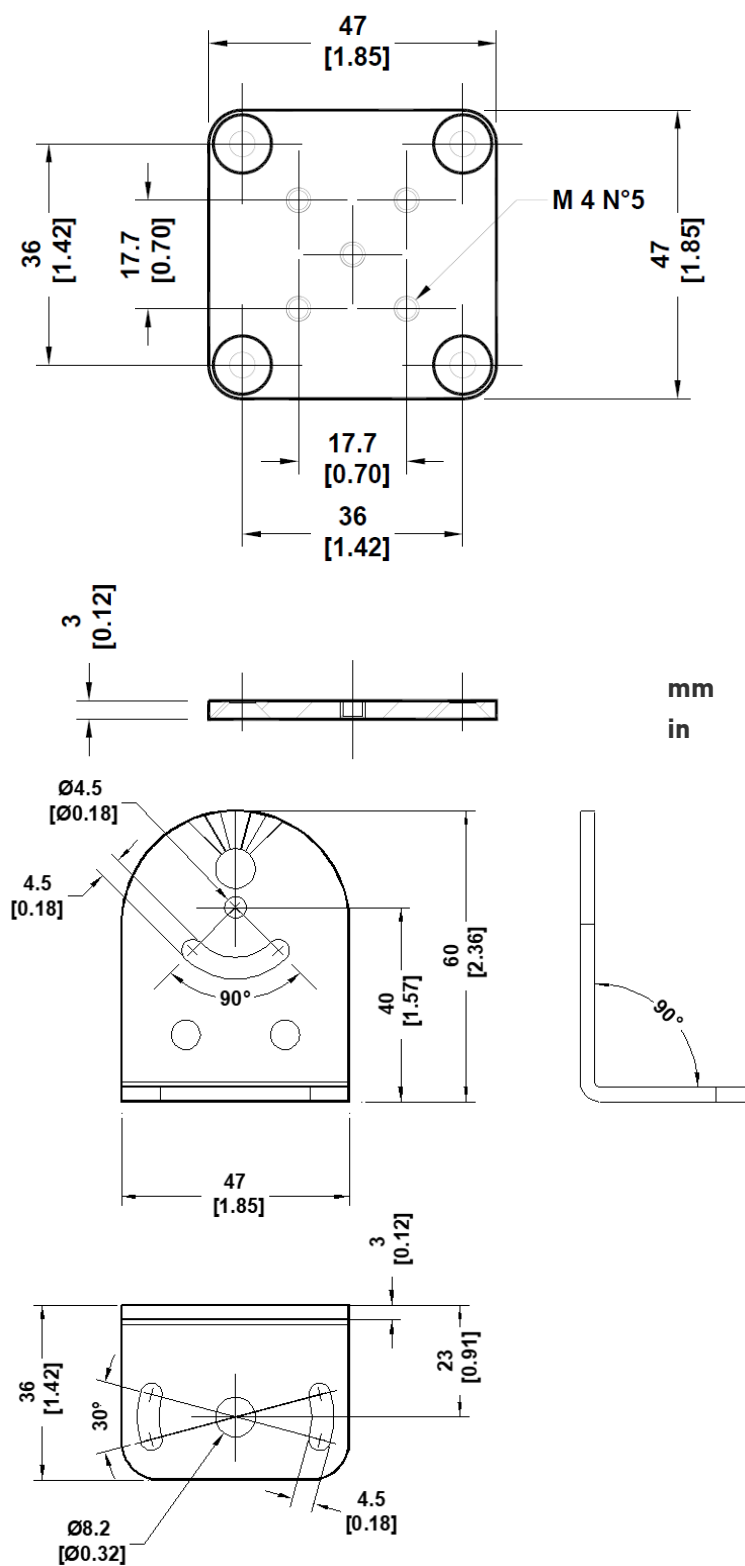


Figure 4 - Mounting Bracket Overall Dimensions

MOUNTING AND POSITIONING THE P-SERIES™

Use the P-Series™ mounting brackets to obtain rotation on the various axes of the camera as shown in the diagram below:

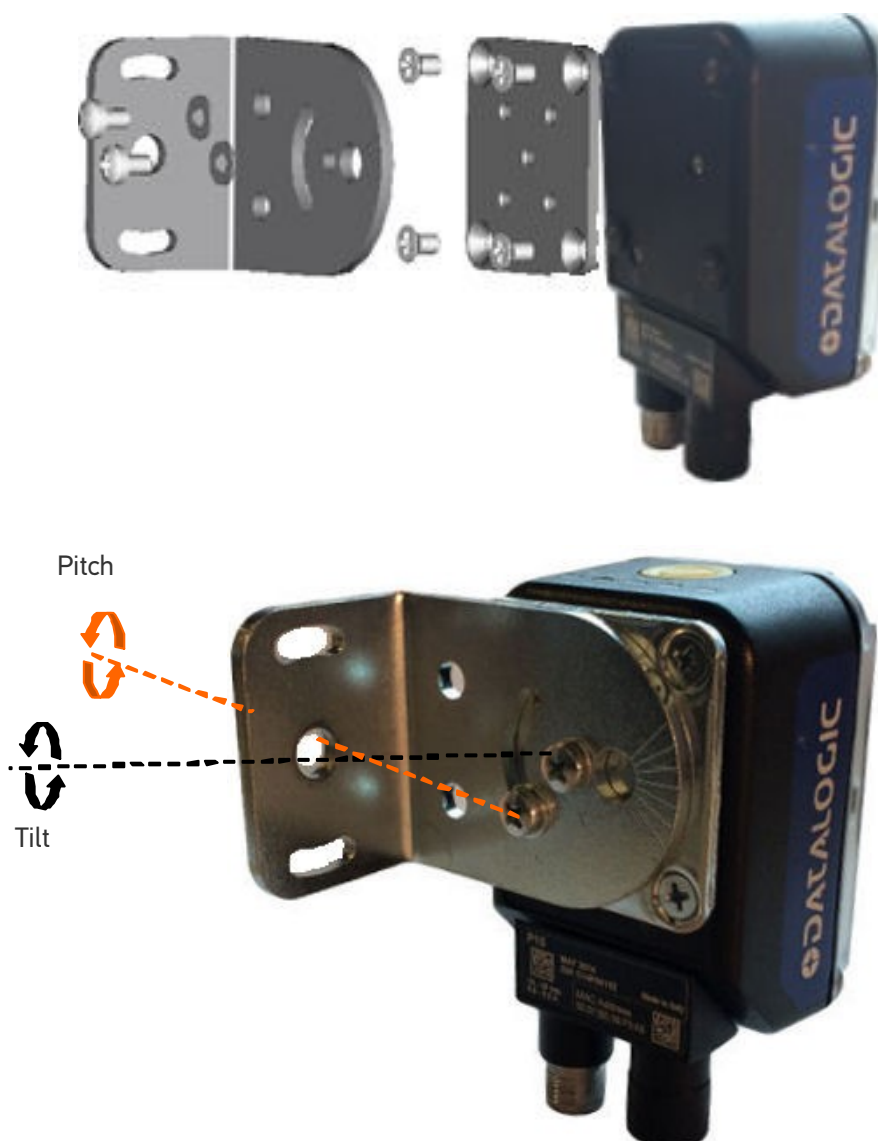


Figure 5 - Positioning with Mounting Bracket

The P-Series™ camera is able to capture and analyze images at a variety of angles. However, when mounting the P-Series™ camera, take into consideration that significant pitch, skew, or tilt may degrade performance.

The **Pitch, Skew and Tilt** angles are represented in Figure 6. Follow the suggestions below for the best orientation:

Position the camera in order to avoid the direct reflection of the light emitted by the P-Series™ camera; it is advised to **assure at least 10°** for the Skew angle.

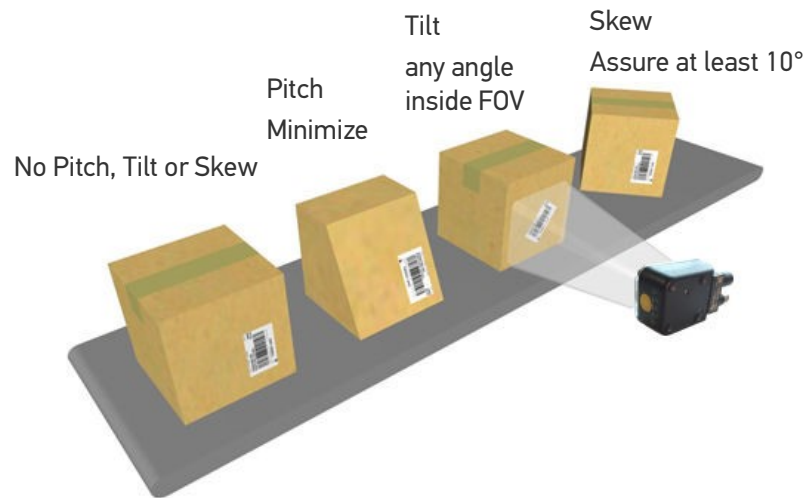


Figure 6 - Orientation

CHAPTER 4

ELECTRICAL CONNECTIONS

CBX ELECTRICAL CONNECTIONS

All P-Series™ models can be connected to a CBX500 or CBX800 connection box through one of the available CAB-DSxx-S accessory cables. These accessory cables terminate in an M12 17-pin connector on the camera side and in a 25-pin male D-sub connector on the CBX side.

We recommend making system connections through one of the CBX connection boxes since they offer the advantages of easy connection, easy device replacement, opto-isolated outputs (Outputs 1 and 2), and filtered reference signals.



If you require direct wiring to the camera, See “Alternative connections” on page 28.


NOTE



When **Outputs 1 and 2 are connected through the CBX connection box, you must set the [Output Type configuration parameters to NPN](#).**

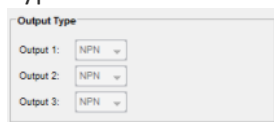
NOTE

The outputs are programmed using VPM.

1. Start VPM
2. Select the General icon. 
3. Select the Communication button.



4. Select NPN for the output type.



The table below gives the terminal block connections on the CBX500/800.

CBX500/800 TERMINAL BLOCK CONNECTORS	
Input Power	
Vdc	Power Supply Input Voltage +
GND	Power Supply Input Voltage -
Earth	Protection Earth Ground

CBX500/800 TERMINAL BLOCK CONNECTORS

Inputs	
+V	Power Source - External Trigger
I1A	External Trigger + or - (polarity insensitive)
I1B	External Trigger + or - (polarity insensitive)
-V	Power Reference - External Trigger
+V	Power Source - Inputs
I2A	Input 2 + or - (polarity insensitive)
I2B	Input 2 + or - (polarity insensitive)
-V	Power Reference - Inputs
Outputs	
+V	Power Source - Outputs
-V	Power Reference - Outputs
O1+	Output 1 + opto-isolated and polarity sensitive
O1-	Output 1 - opto-isolated and polarity sensitive
O2+	Output 2 + opto-isolated and polarity sensitive
O2-	Output 2 - opto-isolated and polarity sensitive
CBX500: O3A	Strobe / Output 3 (Single pin connection)
CBX500: O3B	Not Used
CBX800: O3A	Strobe + /Output 3 +(Opto-isolated; See Note)
CBX800: O3B	Strobe -/Output 3 -
RS232 Interface	
TX	Auxiliary Interface TX
RX	Auxiliary Interface RX
SGND	Auxiliary Interface Reference



NOTE

The strobe signal connection is shared with Output 3. If a non-zero value is defined for the Strobe Pulse Length value (in VPM – Impact – General), the strobe is active. If the value is zero, Output 3 is active.



CAUTION

Do not connect GND and SGND to different (external) ground references. GND and SGND are internally connected through filtering circuitry which can be permanently damaged if subjected to voltage drops over 0.8 Vdc.



NOTE

To avoid electromagnetic interference when the camera is connected to a CBX connection box, verify the jumper positions in the CBX as indicated in its Installation Manual.

POWER SUPPLY

To power the camera and/or I/O devices through the CBX, power must be supplied to the CBX500/800 spring clamp terminal pins as shown in Figure 1.

Power Supply

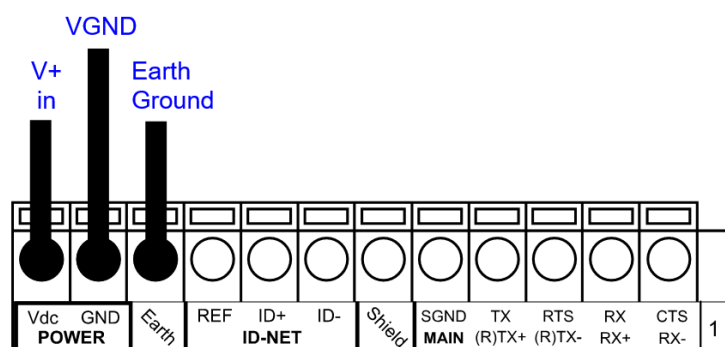


Figure 1- Power Supply Connections

The power must be between 10 and 30 Vdc only.

It is recommended to connect the device CHASSIS to earth ground (Earth) by setting the appropriate jumper in the CBX connection box. See the CBX Installation Manual for details.

RS232 INTERFACE

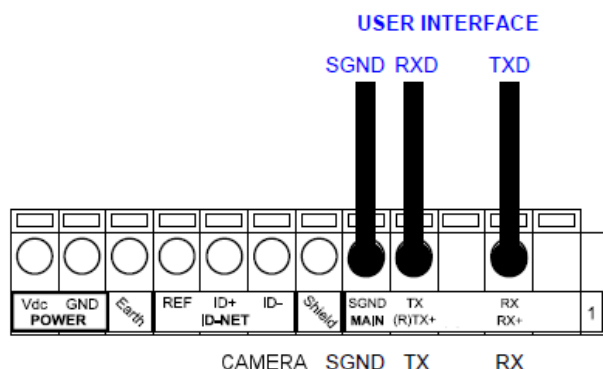
The signals relative to the following serial interface types are available on the CBX spring clamp terminal blocks.

The serial interface parameters (baud rate, data bits, etc.) are defined in VPM software. Refer to the Serial Port section of the Impact Reference Guide.

The following pins are used for RS232 interface connection:

CBX500/800	FUNCTION
TX	Transmit Data
RX	Receive Data
SGND	Signal Ground

It is always advisable to use shielded cables. The overall maximum cable length must be less than 15 m (49.2 ft.).



RS485 Full-Duplex Interface

The Impact software does not support RS485 protocol.

Auxiliary RS232 Interface

The 9-pin female Auxiliary Interface connector inside the CBX is to be used by Factory and Support personnel only.



NOTE

Do not make any connections to the Aux Interface.

INPUTS

There are two optocoupled polarity insensitive inputs available on the camera: Input 1 (Trigger) and Input 2, a generic input:

The Trigger is used to trigger the camera so it will acquire an image.

Input 2 can be used as a signal to a software task to perform an action.

The electrical features of both inputs are:

$V_{AB} = 30 \text{ Vdc max.}$

$I_{IN} = 10 \text{ mA (camera) + 12 mA (CBX) max.}$

The active state of these inputs are selected in software. Refer to the Camera Setup tab and Discrete Input tool sections of the Impact Reference Guide.

An anti-disturbance filter is implemented in software on both inputs so that the default minimum pulse duration is $\cong 0.5$ milliseconds. This value can be increased or decreased through the software parameter Debounce Filter. Refer to the Camera Setup tab section in the Impact Reference Guide for further details.

These inputs are optocoupled and can be driven by both NPN and PNP type commands.



NOTE

Polarity insensitive inputs are full functionality even if pins A and B are exchanged.

The connections are indicated in the following diagrams:

CBX500/800	FUNCTION
+V	Power Source - External Trigger
I1A	External Trigger A (polarity insensitive)
I1B	External Trigger B (polarity insensitive)
-V	Power Reference - External Trigger

EXTERNAL TRIGGER INPUT CONNECTIONS USING P-Series™ POWER



CAUTION

Power from the Vdc/GND spring clamps is available directly to the Input Device on the +V/-V spring clamps, and does not pass through the Power Switch (ON/OFF) inside the CBX. Disconnect all power supplies when working inside the CBX.

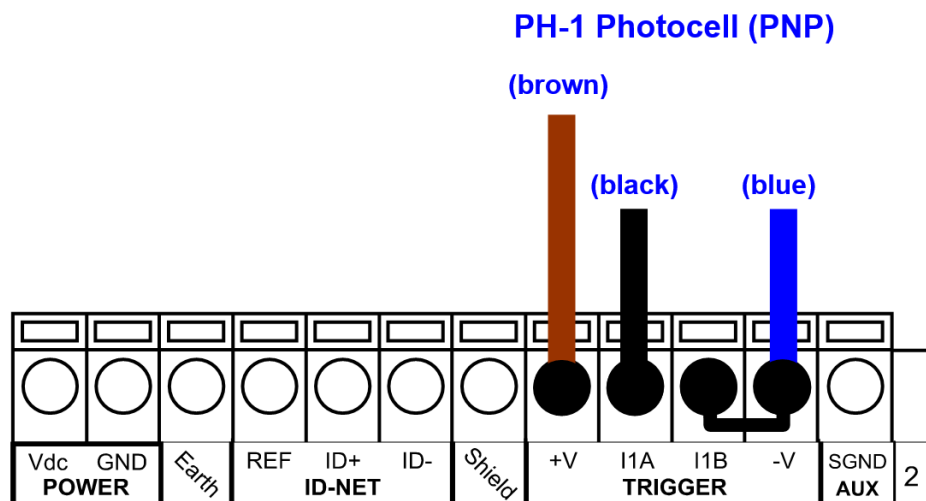


Figure 2 - PH-1 External Trigger Using P-Series™ Power

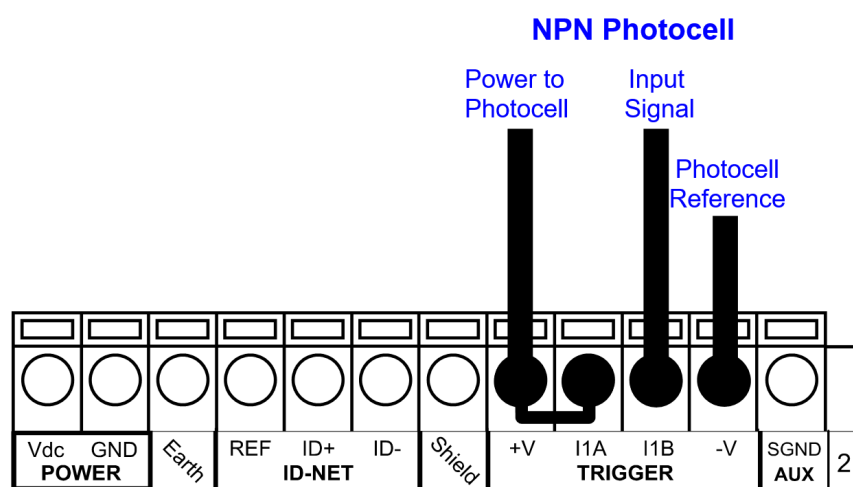


Figure 3 - NPN External Trigger Using P-Series™ Power

EXTERNAL TRIGGER INPUT CONNECTIONS USING EXTERNAL POWER

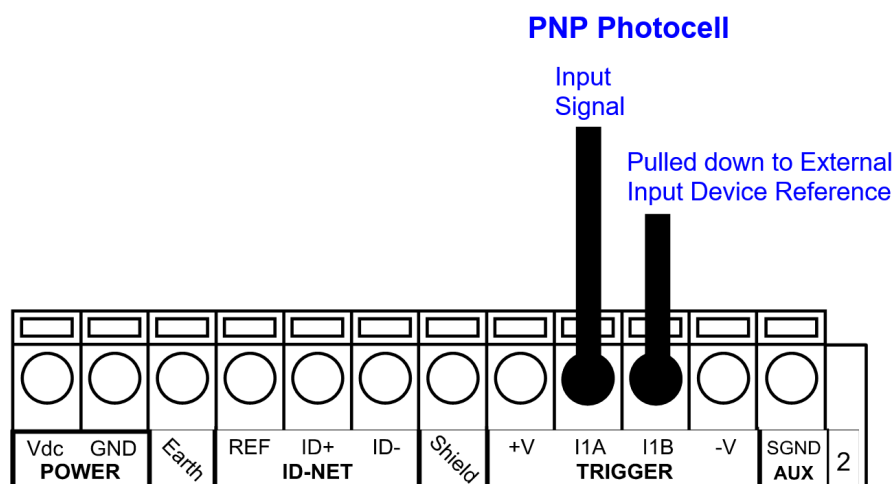


Figure 4 - PNP External Trigger Using External Power

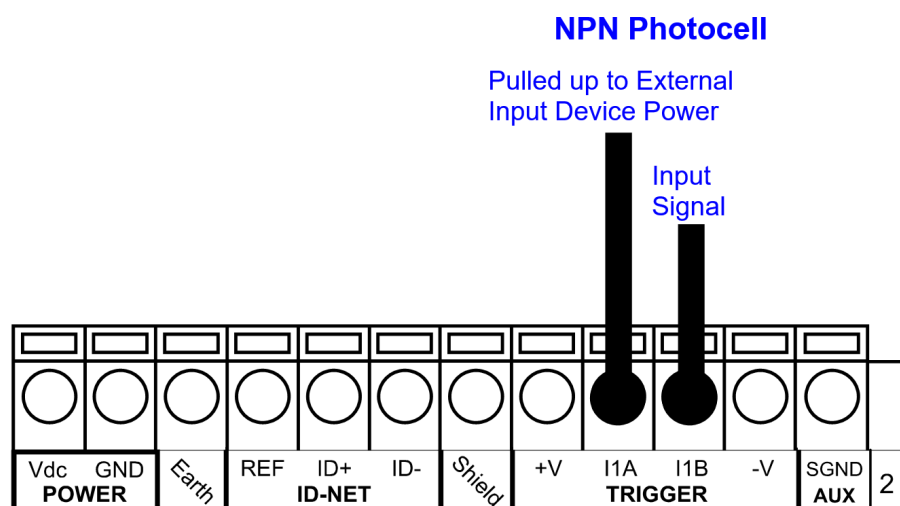


Figure 5 - NPN External Trigger Using External Power

CBX500/800	FUNCTION
+V	Power Source - Inputs
I2A	Input 2 + or - (polarity insensitive)
I2B	Input 2 + or - (polarity insensitive)
-V	Power Reference - Inputs

INPUT 2 CONNECTIONS USING P-Series™ POWER



Power from the Vdc/GND spring clamps is available directly to the Input Device on the +V/-V spring clamps, and does not pass through the Power Switch (ON/OFF) inside the CBX. Disconnect all power supplies when working inside the CBX.

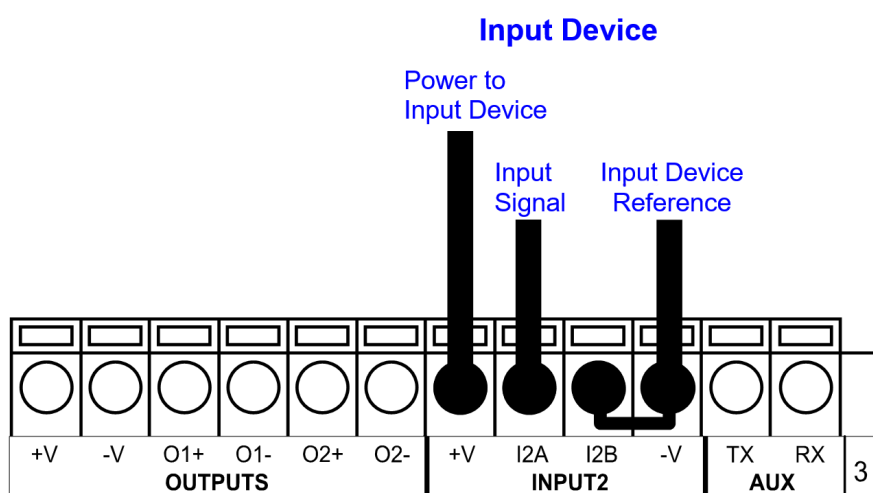


Figure 6 - PNP Input 2 Using P-Series™ Power

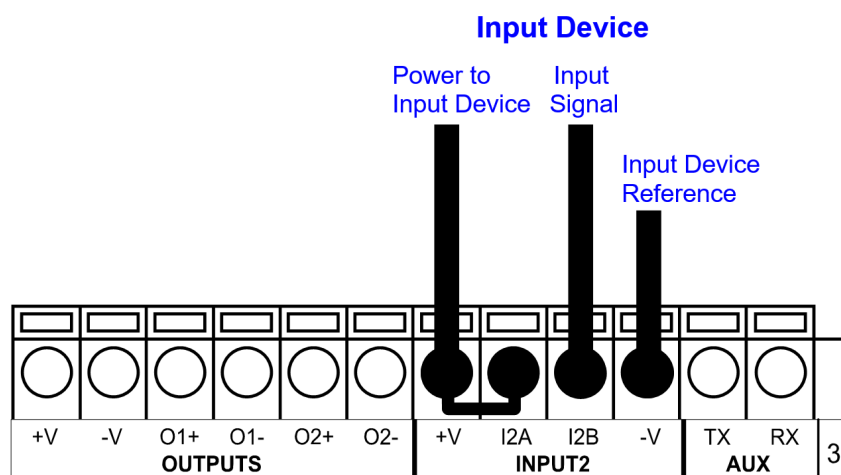


Figure 7 - NPN Input 2 Using P-Series™ Power

INPUT 2 CONNECTIONS USING EXTERNAL POWER

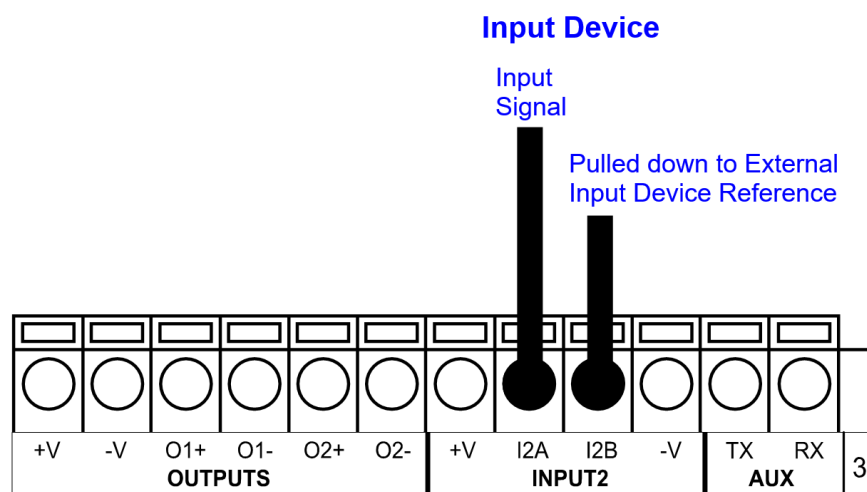


Figure 8 - PNP Input 2 Using External Power

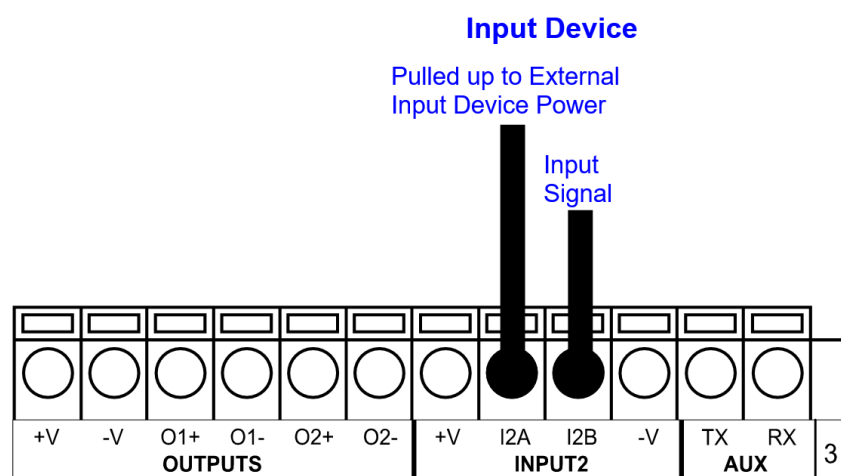


Figure 9 - NPN Input 2 Using External Power

INPUT 3 CONNECTIONS (CBX500 Only)

RESERVED

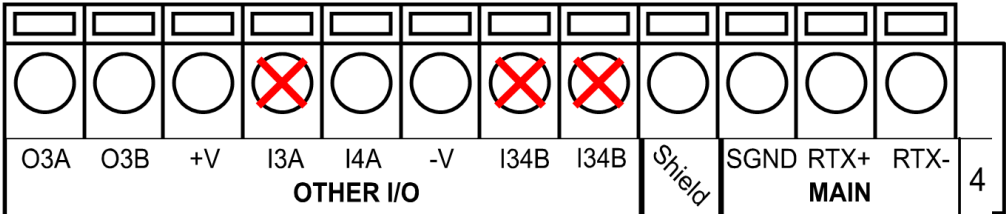
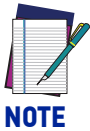
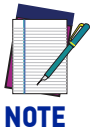


Figure 10 - Input 3 Using External Power



Do not connect to I3A or I34B signals, they are reserved.

OUTPUTS



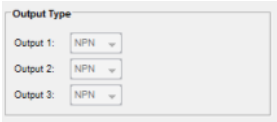
When Outputs 1 and 2 are connected through the CBX connection box, you must set the Output Type configuration parameters to NPN.

The outputs are programmed using VPM.

- 1. Start VPM
- 2. Select the General icon.
- 3. Select the Communication button.



- 4. Select NPN for the output type.



Outputs are typically used either to signal the data collection result or to control an external lighting system.

CBX500/800	FUNCTION
+V	Power Source - Outputs
O1+	Output 1 + opto-isolated and polarity sensitive
O1-	Output 1 - opto-isolated and polarity sensitive
O2+	Output 2 + opto-isolated and polarity sensitive
O2-	Output 2 - opto-isolated and polarity sensitive

CBX500/800	FUNCTION
CBX500: 03A	Strobe /Output 3 (Single pin connection)
CBX500:03B	Not used
CBX800: 03A	Strobe + /Output 3 + (Opto-isolated; See Note)
CBX800: 03B	Strobe - /Output 3 -
-V	Power Reference Outputs

The electrical features of the outputs are the following:

OUTPUT 1 AND 2	OUTPUT 3
$V_{CE} = 30 \text{ Vdc max.}$	Reverse-Polarity and Short-Circuit Protected
$I_{CE} = 40 \text{ mA continuous max.; } 130 \text{ mA pulsed max.}$	$V_{OUT} (I_{LOAD} = 0 \text{ mA}) \text{ max} = 30 \text{ Vdc}$
$V_{CE \text{ saturation}} = 1 \text{ Vdc max. @ } 10 \text{ mA}$	$V_{OUT} (I_{LOAD} = 100 \text{ mA}) \text{ max} = 3 \text{ Vdc}$
$P_D = 90 \text{ mW max. @ } 50^\circ\text{C ambient temp.}$	$I_{LOAD} \text{ max} = 100 \text{ mA}$

The output signal are fully programmable. Refer to the Discrete Output tool section in the Impact Reference Guide for further details.

OUTPUT 1 AND 2 CONNECTIONS USING P-Series™ POWER



NOTE

Power from the Vdc/GND spring clamps is available directly to the Output Device on the +V/-V spring clamps, and does not pass through the Power Switch (ON/OFF) inside the CBX. Disconnect all power supplies when working inside the CBX.

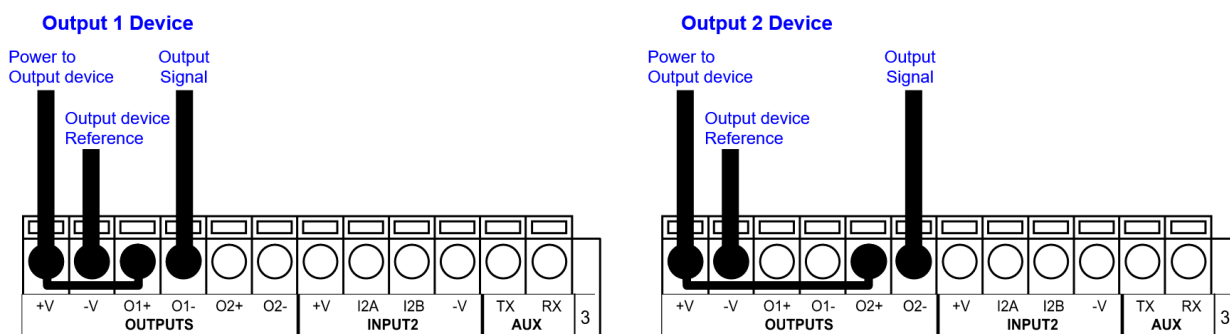


Figure 11 - PNP/Open Emitter Output Using P-Series™ Power

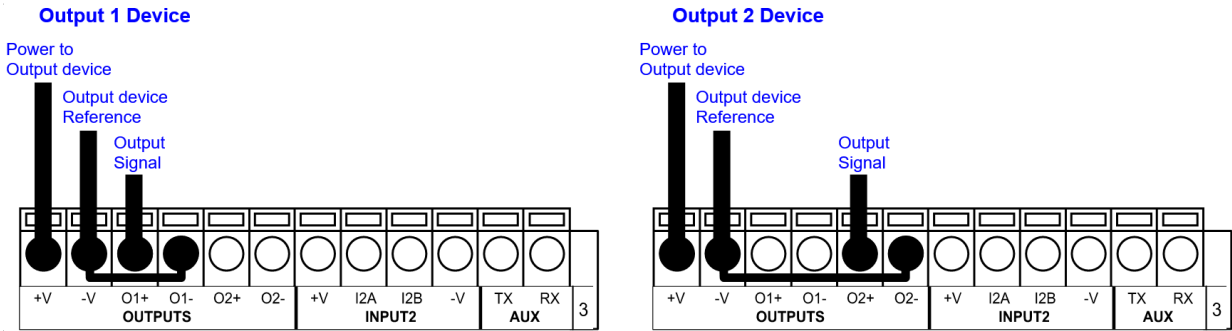


Figure 12 - NPN/Open Collector Output Using P-Series™ Power

OUTPUT 1 AND 2 CONNECTIONS USING EXTERNAL POWER

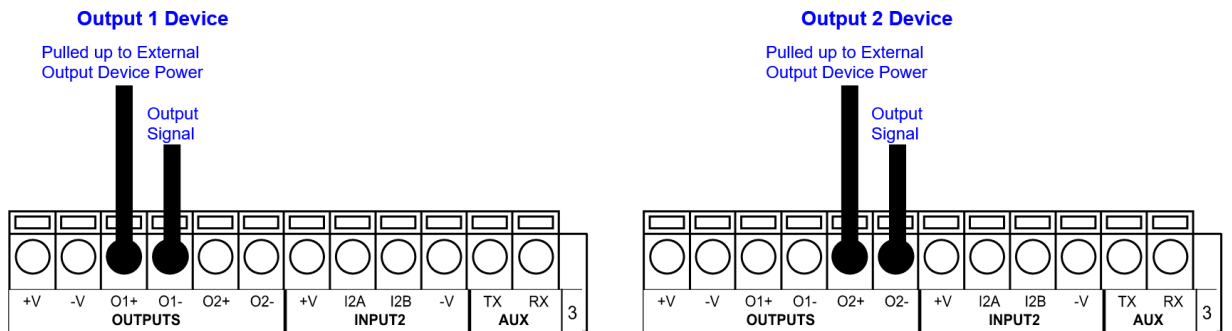


Figure 13 - PNP/Output Open Emitter Using External Power

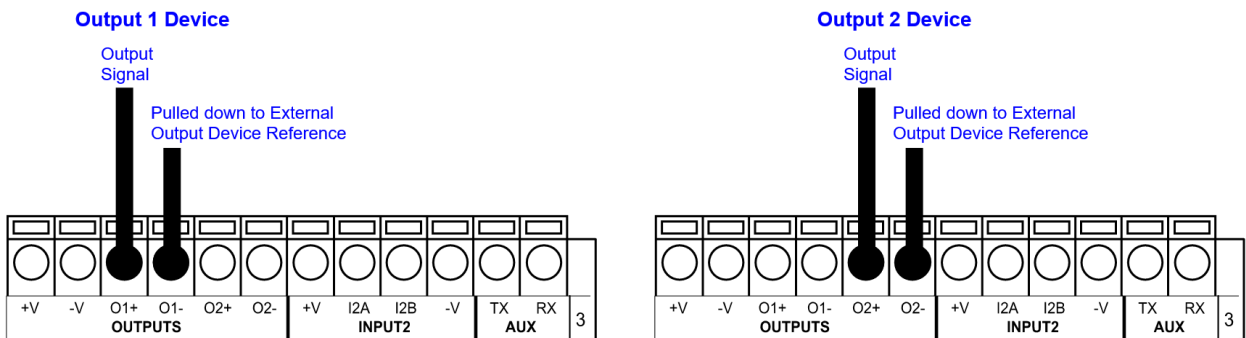


Figure 14 -NPN/Output Open Collector Using External Power

Output 3 is **not opto-isolated** but can be assigned to the same events. By default it is not assigned to any event. The CBX500 or CBX800 must be used to connect this output.

OUTPUT 3 CONNECTIONS USING P-Series™ POWER (CBX500 Only)

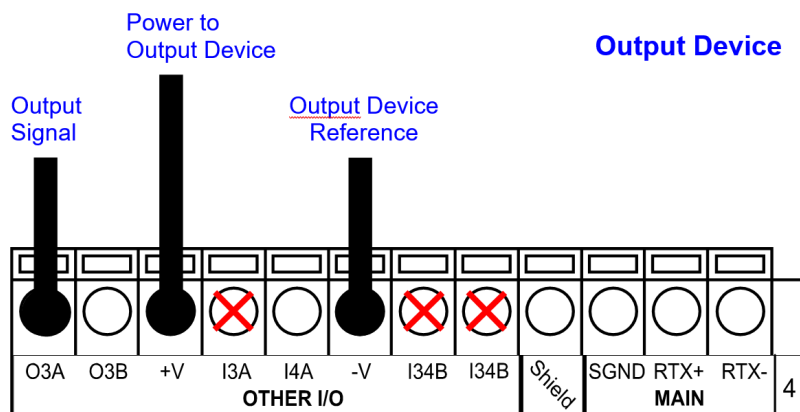


Figure 15 - Output 3 Using P-Series™ Power

OUTPUT 3 CONNECTIONS USING EXTERNAL POWER (CBX500 Only)

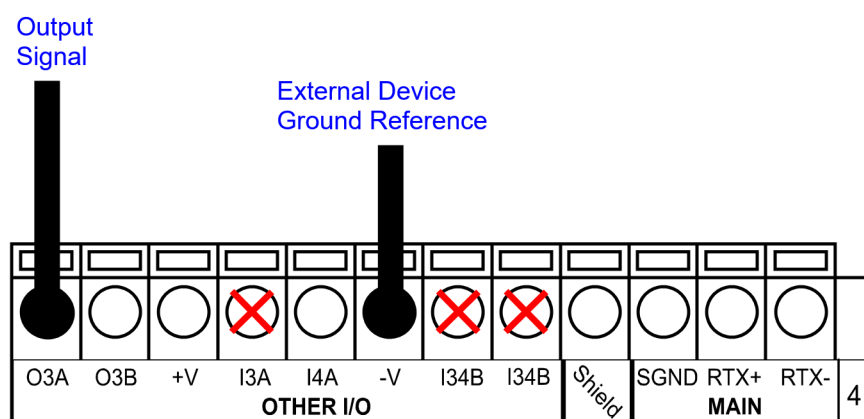


Figure 16 - Output 3 Using External Power



NOTE

Do not connect to I3A or I34B Signals, they are reserved.

OUTPUT 3 CONNECTIONS USING P-Series™ POWER (CBX800 Only)

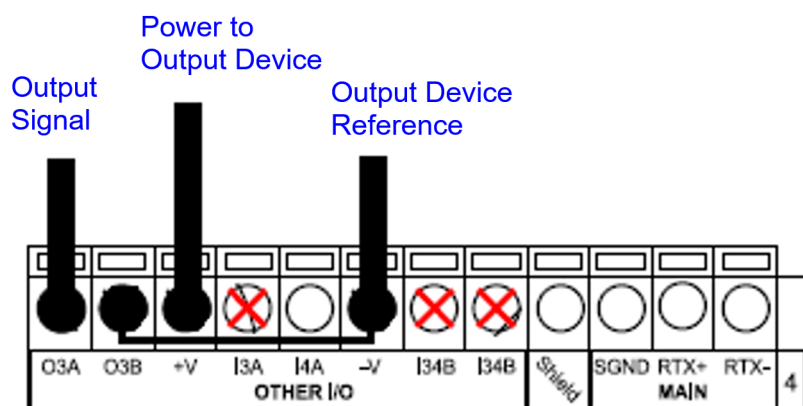


Figure 17 - Output 3 Using P-Series™ Power

OUTPUT 3 CONNECTIONS USING EXTERNAL POWER (CBX800 Only)

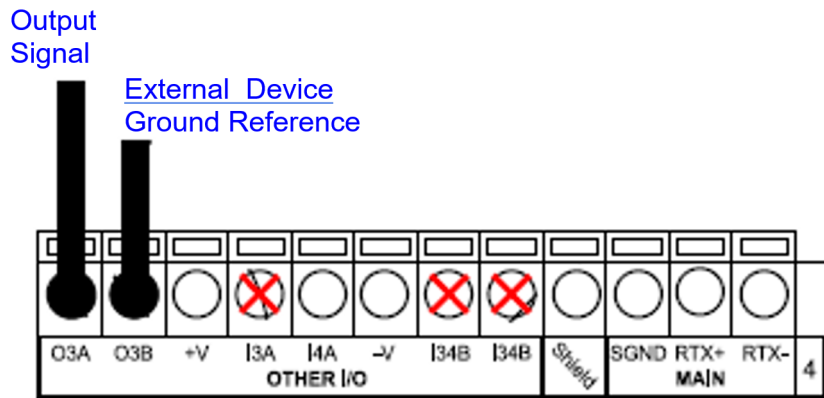


Figure 18 - Output 3 Using External Power

ON-BOARD ETHERNET INTERFACE

The on-board Ethernet Interface can be used for TCP/IP communication with a remote or local host computer by connecting the camera to either a LAN or directly to a host PC. There is no need to use a crossover adapter since P-Series™ incorporates an auto-cross function.

A **CAB-ETH-M0x** cable can be used to connect to a LAN.

On the camera Ethernet interface the following communication channels are available:

Data Socket	Image Socket
WebSentinel Socket	Image FTP Client
HTTP Server	Ethernet/IP
Profinet IO	Modbus TCP

SERIAL INTERFACE

The following table contains the pinout for standard RS232 Serial interface.

RS232 PC-SIDE CONNECTIONS			
<p>9-pin male connector</p>		<p>25-pin male connector</p>	
Pin	Name	Pin	Name
2	RX	3	RX
3	TX	2	TX
5	GND	7	GND

ALTERNATIVE CONNECTIONS

The connector pinouts and notes given in this chapter are for custom cabling applications.

Power, COM and I/O Connector

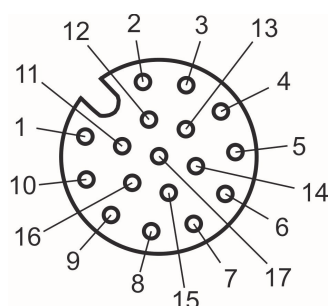
The CAB-DSxx-S cable has an M12 17-pin connector on the camera end and a 25-pin male D-sub connector on the other end.



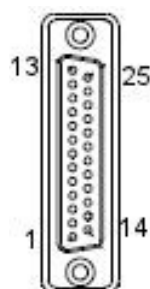
CAUTION

Do not disconnect the cable while power is on.

The details of the connector pins and terminal block are indicated in the following table.



M12 17-pin COM (female end),
I/O and Power Connector



D-sub 25-pin (pin end)



I/O Terminal Block (95A906346)

17-PIN M12	D-SUB/ TERMINAL BLOCK PIN	NAME: FUNCTION
1 Red	9 & 13	Vdc: Power Supply Input voltage +
2 Blk	7 & 25	GND: Power Supply Input voltage -
Connector Case	1 (Shield)	CHASSIS: Connector case - electrical connection to chassis
6 Org	18	I1A: External Trigger + or - (Polarity Insensitive)
5 Grn-Blk	19	I1B: External Trigger + or - (Polarity Insensitive)
13 Gry	6	I2A: Input 2 + or - (Polarity Insensitive)
3 Grn-Red	10	I2B: Input 2 + or - (Polarity Insensitive)
9 Pur	8	O1: Output 1 (Note 1; Opto-isolated only when connected to CBX500 or CBX800 connection box)
8 Wht-Red	11	O2: Output 2 (Note 1; Opto-isolated only when connected to CBX500 or CBX800 connection box)
16 Blk-Wht	14 & 16	O3: Output 3 (Notes 1, 2; Opto-isolated only when connected to CBX800 connection box)
14 Yel-Blu	20	Reserved
4 Yel-Wht	21	Reserved
17 Yel	2	TX: RS232 Transmit
11 Bm	3	RS: RS232 Receive
12 Pnk	4	Reserved
10 Gm	5	Reserved

17-PIN M12	D-SUB/ TERMINAL BLOCK PIN	NAME: FUNCTION
		NOTES: 1: Short-circuit protected; NPN or PNP (configure in VPM – Camera Setup) 2: Strobe signal connection shared with Output 3. If the Strobe Pulse Length is zero, Output 3 is active. (Configure in VPM – Settings – Camera – General)

In order to meet EMC requirements:

- connect the camera chassis to the plant earth ground by means of a flat copper braid shorter than 100 mm;
- connect your cable shield to the locking ring nut of the connector.

On-board Ethernet Connector

A Standard M12 D-Coded female connector is provided for the on-board Ethernet connection. This interface is IEEE 802.3 10 BaseT and IEEE 802.3u 100 BaseTx compliant.



Figure 19 - M-12 D-Coded Female Ethernet Network Connector

ON-BOARD ETHERNET NETWORK CONNECTOR PINOUT		
Pin	Name	Function
1	TX+	Received data (+)
2	RX+	Transmitted data (+)
3	TX-	Transmitted data (-)
4	RX-	Received data (-)

Outputs

Three general purpose **non opto-isolated** but short circuit protected outputs are available on the M12 17-pin connector.

The pinout is the following:

Pin	Name	Function
9	O1	Configurable digital output 1
8	O2	Configurable digital output 2
16	O3	Configurable digital output 3
2	GND	Output reference signal

The electrical features of the three outputs are the following:

Reverse-Polarity and Short-Circuit Protected

$V_{OUT} (I_{LOAD} = 0 \text{ mA}) \text{ max} = 30 \text{ Vdc}$

$V_{OUT} (I_{LOAD} = 100 \text{ mA}) \text{ max} = 3 \text{ Vdc}$

$I_{LOAD} \text{ max} = 100 \text{ mA}$

The output signals are fully programmable using the Discrete Output tool in VPM.

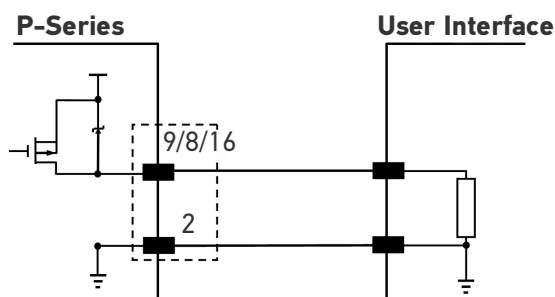


Figure 20 - PNP Output Connection

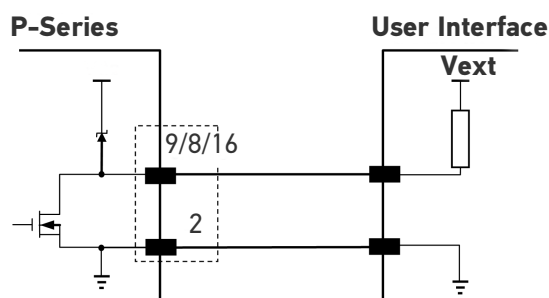


Figure 21 - NPN Output Connection



For NPN output connections, the external interface voltage (V_{ext}) must not exceed the P-Series™ power supply source voltage (V_{dc}) otherwise correct output functioning cannot be guaranteed.

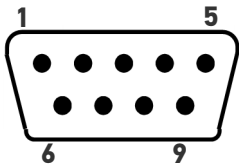
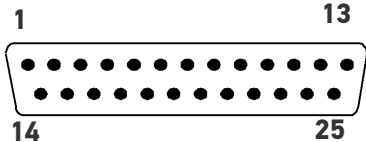
Datalogic SIL Spot red flood strobe

To use the Datalogic SIL strobe with the P-Series™ camera and a CBX500/800, make the following connections to the CBX box. Output 3 must be configured as shown (VPM –

General – Communication). External strobe length is configured in VPM – Camera – General – Setup.

SIL STROBE WIRE COLOR	CBX500	CBX800
Brown	V+	V+
Blue	V-	V-
Black	O3A (Output 3 configured as PNP)	O3B (Output 3 configured as NPN)
		Also add a jumper between V+ and O3A

RS-232 Serial Connector

RS232 PC-SIDE CONNECTIONS			
			
9-pin male connector		25-pin male connector	
Pin	Name	Pin	Name
2	RX	3	RX
3	TX	2	TX
5	GND	7	GND

CHAPTER 5

TYPICAL LAYOUTS

The following typical layouts refer to system hardware configurations. However, they also require the correct setup of the software configuration parameters.

ETHERNET CONNECTION

The Ethernet connection is possible in two different layouts. In both layouts, before proceeding with the connection, it is necessary to configure the camera Ethernet parameters in VPM. For further details, refer to Configuring the Impact Device or Camera in the Impact Reference Guide.

In a Point-to-Point layout the camera is connected to a local host by using a **CAB-ETH-M0x** cable. There is no need to use a crossover adapter since the P-Series™ camera incorporates an autocross function.

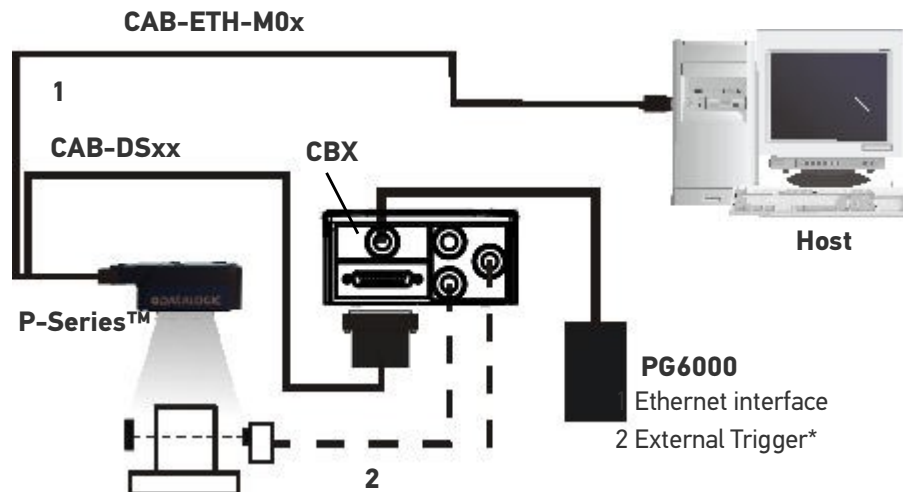


Figure 1 - Ethernet Point-to-Point Layout

* The external trigger is not needed when a software trigger is supplied by the host.

When using a Local Area Network (LAN), one or more P-Series™ cameras can be connected to the network by using **CAB-ETH-M0x** cables:

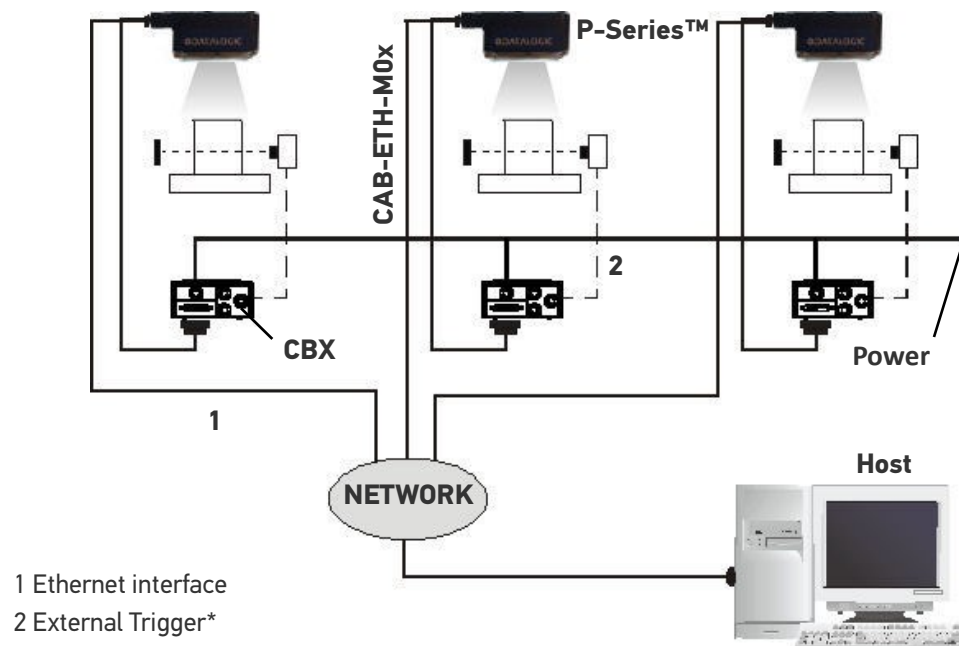


Figure 2 - Ethernet Network Layout

*The external trigger is not needed when a software trigger is supplied by the host.

CHAPTER 6

IMAGE CAPTURE FEATURES

MAXIMUM LINE SPEED AND EXPOSURE TIME CALCULATIONS

The **Shutter Open Time (Exposure Time)** parameter defines the time during which the image will be exposed to the camera sensor to be acquired. This parameter depends heavily on the environmental conditions (external lighting system, image contrast etc.).

In general, a longer time corresponds to a lighter image but is susceptible to blurring due to the code movement; a shorter exposure time corresponds to a darker image.



NOTE

The following considerations must be applied only when the internal lighting system is used.

Assuming:

- **X**: Part Resolution (mm)
- **T_{exp}**: Exposure Time (s)
- **LS**: Line Speed (mm/s)

The essential condition to avoid blurring effects between two adjacent elements in a dynamic reading application is:

$$LS * T_{exp} \leq X$$

The maximum (theoretical) line speed **LS** can be calculated as follows:

$$X / T_{exp (max)} = LS (max)$$

Example:

Using:

Internal Lighting Mode = Power

Exposure Time = 100 μ s

Part Resolution (X) = 0.254 mm (10 mils)

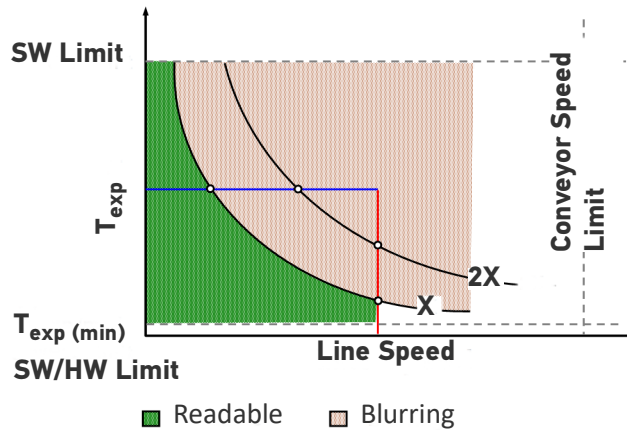
has a maximum line speed of:

$$0.254 \text{ (mm)} / 0.0001 \text{ (s)} = 2540 \text{ mm/s}$$

Likewise, $T_{\text{exp (max)}}$ is the maximum **Shutter Open Time** value that can be used without blurring for the given application line speed and part resolution. Therefore:

$$X / LS_{\text{(max)}} = T_{\text{exp (max)}}$$

$T_{\text{exp (max)}}$ and $LS_{\text{(max)}}$ are represented in the graph below as the curved line for X (part resolution). Values above the curve result in blurring. In practice, the application values are somewhere below the theoretical line, (in the green area), due to environmental and other conditions.



For example, the maximum target speed in the application is also affected by these conditions:

- **Part/Background Contrast:** maximum speed decreases when decreasing image contrast (poor quality images, reflective transparent coverings, different supports and printing techniques).
- **Part Resolution:** maximum speed increases when decreasing code resolution, (i.e. $2X$). There is a decrement of overlapping effects between two adjacent elements.
- **Tilt Angle:** maximum speed decreases when increasing Tilt angle (from 0 to 45 degrees).

$T_{\text{exp (min)}}$ is the minimum **Shutter Open Time** value obtainable for the specific application. It can be evaluated in static conditions and depends on the P-Series™ camera hardware selected for the application (internal lighting system, optical lens, reading distance) and on any external lighting system. It may also depend on image quality and camera position.

The Internal Illuminator, which is adjusted in VPM – Settings – Camera, sets the internal lighting system operating mode. The possible values are:

- **Disabled:** the built-in LED array is turned off all the time. This option can be useful if using an external lighting system;
- **Normal:** the built-in LED array is turned on during the shutter open time at the lowest power level.
- **Power:** the built-in LED array is turned on during the shutter open time at the highest power level.

CHAPTER 7

SOFTWARE CONFIGURATION

Software configuration of your P-Series™ camera is accomplished using VPM. VPM runs on a host computer connected to the camera with an Ethernet cable (CAB-ETH-M0x) either directly or through a local area network (LAN). Refer to the Impact Reference Guide for details about creating vision programs for the P-Series™ camera.

HOST COMPUTER SYSTEM REQUIREMENTS

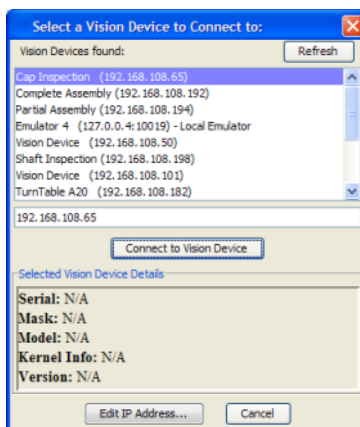
- Intel®, AMD®, or VIA® x86-class processor -minimum 1.2 GHz; 64-bit processors are supported with Windows 7, Windows 8.1, and Windows 10
- Microsoft® Windows 7, Windows 8.1, or Windows 10
- 1 GB or more of RAM, 2 GB recommended
- 800MB or more of available hard disk space
- 10/100Mbps Ethernet connection
- Monitor display resolution of 1024 x 768 or greater
- A PDF reader is required to read the software and hardware manuals

STARTUP

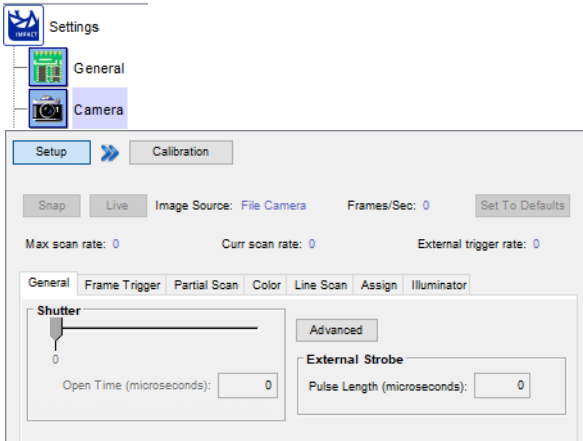
After completing the mechanical and electrical connections to P-Series™ camera, you can begin software configuration as follows:

1. Power on the P-Series™ camera. Wait for the camera startup. The system bootstrap requires a few seconds to be completed.
2. Run VPM.

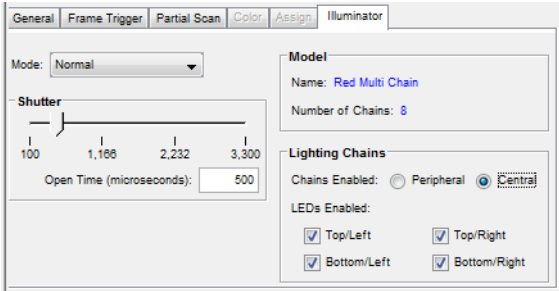
Click the Connect button in the VPM tool bar. A dialog is displayed so you can choose to connect to the P-Series™ camera. If the camera does not appear in the list, refer to the Impact Reference Guide - General Setup tab.



- 3. When the connection is complete, click the Settings tab.
- 4. Click the camera icon, click the Setup tab, then click the Setup button below the image window.



- 5. Use the General tab to set the Shutter open time.
- 6. Click the Illuminator tab to configure the P-Series™ camera's internal illuminator. The illuminator settings will affect the shutter Open Time range.



MODE

This sets the Internal Illuminator's operating mode (Disabled, Normal, Power). This also affects the permitted Shutter Open Time range.

Mode	Shutter Open Time Range (microseconds)
Disabled	10-1,000,000
Normal	100-3,300
Power	1-500

SHUTTER

This is the amount of time the shutter is open. The higher the number, the longer the shutter is open and the brighter the image. The Mode type affects the Shutter range limits.

MODEL

This box contains the model name of the Internal Illuminator mounted on the camera, and the number of Lighting Chains that the Illuminator contains.

LIGHTING CHAINS

If the Illuminator contains multiple chains, this box configures the number of LEDs that will be enabled.

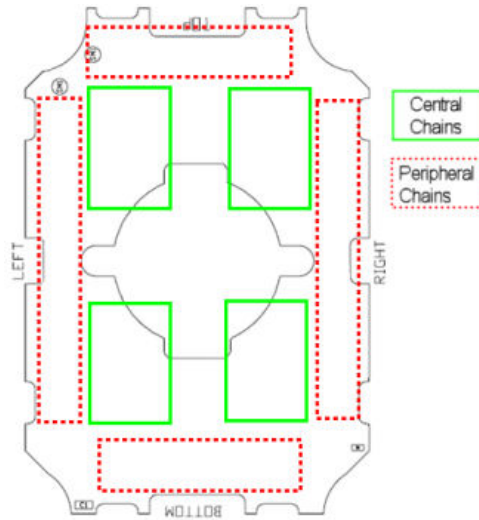
CHAINS ENABLED

Peripheral: The four LEDs around the edge of the Illuminator can be enabled (top, bottom, left, right).

Central: The four LEDs in the central part of the Illuminator can be enabled (top/left, top/right, bottom/left, bottom/right).

LEDS ENABLED

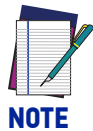
If a check box is checked, the LEDs in those areas of the illuminator will fire when the camera is triggered. The choices are based on the Chains Enabled setting.



CALIBRATION

VPM provides calibration software to insure that the measurements indicated in VPM tools accurately relate to the inspected object's measurements. You may calibrate a camera using a calibrated target, a part with known dimensions, or you can enter the camera's units-per-pixel factor manually.

Refer to the Calibration Panel section of the Impact Reference Guide for details.



NOTE

In general, a longer shutter open time corresponds to a lighter image but is susceptible to blurring due to part movement. Shutter open time is also limited by the lighting. Longer shutter open times can be set if the power strobe level is lowered.

High gain settings may produce a grainy image that may affect the inspection process.

UNDER-EXPOSURE:

To correct this result it is recommended to change the parameters in the following order:

1. increase the **Shutter Open Time**
2. increase the **Gain**



Figure 1 - Example Under Exposure: Too Dark

OVER-EXPOSURE

To correct this result, change the parameters in the following order:

1. decrease the **Gain**
2. decrease the **Exposure Shutter Open Time**

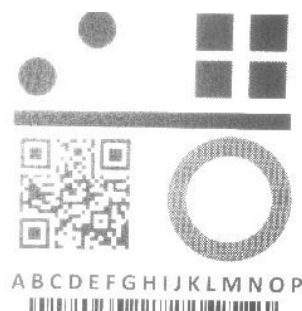


Figure 2 - Example Over Exposure: Too Light

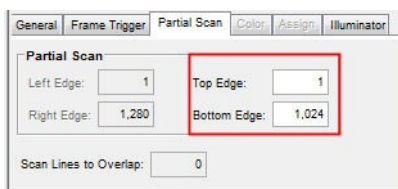
PARTIAL SCAN

In order to satisfy very high throughput applications, higher frame rates can be achieved using the powerful **Partial Scan** parameters in the Camera setup menu.

Partial Scan allows defining a region or window within the camera Field of View. The Top and Bottom Edge parameters allow you to precisely define the image window to be processed.

In the camera the frame rate is dependent on the number of lines (or rows) in the defined window.

The smaller the window, the shorter the frame period, and consequently the higher the frame rate. In general, the Image Processing time can be reduced by reducing the window dimensions.



CHAPTER 8

MAINTENANCE

CLEANING

Clean the lens cover periodically for continued correct operation of the camera.

Dust, dirt, etc. on the lens cover may alter the reading performance.

Repeat the operation frequently in particularly dirty environments.

Use soft material and alcohol to clean the lens cover and avoid any abrasive substances.

TROUBLESHOOTING

General Guidelines

- When wiring the device, pay careful attention to the signal name (acronym) on the CBX500/800 spring clamp connectors. If you are connecting directly to the P-Series™ M16 19-pin connector, pay attention to the pin number of the signals.
- If you need information about a certain camera parameter you can refer to the Impact Reference Guide.
- If you're unable to fix the problem and you're going to contact your local Datalogic office or Datalogic Partner, we suggest providing (if possible): software version, Serial Number, and Order Number of your camera. You can get some of this information while VPM is connected to the camera. The software version is shown in the About dialog, and the Serial Number can be obtained from the Device Connection Dialog.

TROUBLESHOOTING GUIDE	
Problem	Suggestion
Power ON: the "POWER" LED is not lit.	<ul style="list-style-type: none">• Is power connected?• If using a power adapter (like PG6000), is it connected to wall outlet?• If using rail power, does rail have power?• If using CBX, does it have power (check switch and LED)?• Check if you are referring to the M16 19-pin connector or to the CBX spring clamp connectors.• Measure Voltage either at pin A and pin L (for 19-pin connector) or at spring clamp Vdc and GND (for CBX).

TROUBLESHOOTING GUIDE

Using Input 1 (External Trigger):

A trigger signal is connected to the camera, but it is not acquiring images or running tasks.

- Check if you are referring to the 19-pin connector or to the CBX spring clamp connectors.
- Is the sensor connected to Input 1 or Input 2?
- Is power supplied to the photo sensor?
- For NPN configuration, is power supplied to one of the two I1 or I2 signals (A or B)?
- For PNP configuration, is one of the two I1 or I2 signals grounded (A or B)?
- Are the photo sensor LEDS (if any) working correctly?
- Is the sensor/reflector system aligned (if present)?
- In VPM, check the Debounce settings (Settings – General – Communication).
- Is the camera online?

TROUBLESHOOTING GUIDE

Problem	Suggestion
The image is not clear	<ul style="list-style-type: none"> • Verify the Focus procedure.
Image focused but tool measurements are inaccurate:	<ul style="list-style-type: none"> • Verify the image calibration procedure.

TROUBLESHOOTING GUIDE

Problem	Suggestion
Communication: camera is not transmitting anything to the host.	<ul style="list-style-type: none"> • Is the Ethernet cable wiring correct? • Is the Ethernet cable wiring connected? • Are the host IP address settings compatible with the camera settings?
Communication: data transferred to the host are incorrect, corrupted or incomplete.	<ul style="list-style-type: none"> • Are the host IP address settings the same as the camera settings? • Is the Ethernet cable intermittent?
How do I obtain my camera Serial Number?	<ul style="list-style-type: none"> • The camera Serial Number consists of the letter “C” followed by a series of numbers. It is printed in the rear of the camera.

TECHNICAL FEATURES

ELECTRICAL FEATURES

Power

Supply Voltage	10 to 30 Vdc
Consumption	0.7 to 0.2 A

Communication Interfaces

Ethernet	10/100 Mbit/s (supports application protocols: TCP/IP, EtherNet/IP, Profinet IO, Modbus TCP)
RS232	2400 to 115200 bit/s

ELECTRICAL FEATURES		
Inputs		
Input 1 (External Trigger) and Input 2	Opto-coupled and polarity insensitive	
Max. Voltage	30 Vdc	
Max. Input Current	10 mA	
Outputs		
Output 1 and 2	<ul style="list-style-type: none">NPN or PNP short circuit protected (configure in VPM-Camera Setup)Opto-isolated only when connected to CBX500 or CBX800 connection box	
Output 3	<ul style="list-style-type: none">NPN or PNP short circuit protected (configure in VPM-Camera Setup)Opto-isolated only when connected to CBX800 connection boxStrobe signal connection shared with Output 3. If the Strobe Pulse Length is zero, Output 2 is active. (Configure in VPM- Impact)	
V _{OUT} (I _{LOAD} = 0 mA) Max.	30 Vdc	
V _{OUT} (I _{LOAD} = 100 mA) Max.	3 Vdc	
Load Max	100 mA	
OPTICAL FEATURES		
Image Sensor	CMOS sensor with Global Shutter	
Pixel Size	5.3 μm square	
Image Format	P10, P12	P15, P17
Frame Rate	VGA: 640x480	SXVGA: 1280x1024
Imager Size	120 frames/sec	58 frames/sec
	¼"	1/1.8"
Led Safety	to EN 62471	
Lighting System	Internal Illuminator and External Strobe (Output 3)	
ENVIRONMENTAL FEATURES		
Operating Temperature	0 to 50°C (32 to 122°F) use metal mounting bracket for heat dissipation in high ambient temperatures	
Storage Temperature	-20° to 70°C (-4 to 158°F)	
Max. Humidity	90% non condensing	
Vibration Resistance EN 60068-2-6	14 mm @ 2 to 10 Hz; 1.5 mm @ 13 to 55 Hz; 2 g @ 70 to 200 Hz; 2 hours on each axis	
Bump Resistance EN 60068-2-29	30g; 6 ms; 5000 shocks on each axis	
Shock Resistance EN 60068-2-27	30g; 11 ms; 3 shocks on each axis	
Protection Class EN 60529	IP65/IP67 (when correctly connected to IP67 cables with seals)	
PHYSICAL FEATURES	CONNECTOR POSITION 0°	CONNECTOR POSITION 90°
Dimensions	95 x 54 x 43 mm (3.7 x 2.1 x 1.7 in.)	75 x 54 x 62 mm (3.0 x 2.1 x 2.4 in.)
Weight	about 238 g. (8.4 oz.)	
Material	Aluminium	
USER INTERFACE		
LED Indicators	Power, Busy/Trigger, Out 1; Out 2; Out 3, Online	

ELECTRICAL FEATURES

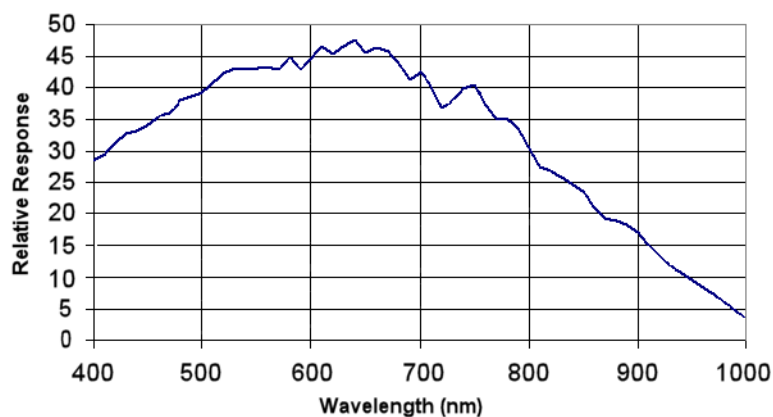
Keypad Button	Reset; Camera Button Event (internal software event only)
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* when connected to the CBX connection boxes the electrical features for Output 1 and 2 become the following:

$V_{CE} = 30 \text{ Vdc max.}; I_{CE} = 40 \text{ mA continuous max.}; 130 \text{ mA pulsed max.}; V_{CE \text{ saturation}} = 1 \text{ Vdc max. @ } 10 \text{ mA};$

$P_D = 90 \text{ mW Max. @ } 50^\circ \text{C ambient temp.}$

Optical sensor response



CHAPTER 9

GLOSSARY

BARCODES (1D CODES)

A pattern of variable-width bars and spaces which represents numeric or alphanumeric data in machine-readable form. The general format of a barcode symbol consists of a leading margin, start character, data or message character, check character (if any), stop character, and trailing margin. Within this framework, each recognizable symbology uses its own unique format.

BIOS

Basic Input Output System. A collection of ROM-based code with a standard API used to interface with standard PC hardware.

BIT

Binary digit. One bit is the basic unit of binary information. Generally, eight consecutive bits compose one byte of data. The pattern of 0 and 1 values within the byte determines its meaning.

BITS PER SECOND (BPS)

Number of bits transmitted or received per second.

BRIGHT FIELD ILLUMINATION

Lighting of surfaces at high (narrow) angles used to provide maximum reflection of the light to the camera's lens. This is effective on surfaces that absorb light or are not highly reflective and also on low contrast codes.

BYTE

On an addressable boundary, eight adjacent binary digits (0 and 1) combined in a pattern to represent a specific character or numeric value. Bits are numbered from the right, 0 through 7, with bit 0 the low-order bit. One byte in memory can be used to store one ASCII character.

DARK FIELD ILLUMINATION

Lighting of surfaces at wide angles used to avoid direct reflection of the light into the camera's lens. Typically this type of lighting is used in solutions to enhance reflectance of the uneven surface. It is also used with very reflective surfaces.

DECODE

To recognize a barcode symbology (*e.g.*, Codabar, Code 128, Code 3 of 9, UPC/EAN, etc.) and analyze the content of the barcode scanned.

DEPTH OF FIELD

The difference between the minimum and the maximum distance of the object in the field of view that appears to be in focus.

DIFFUSED ILLUMINATION

Distributed soft lighting from a wide variety of angles used to eliminate shadows and direct reflection effects from highly reflective surfaces.

ELEMENT

The basic unit of data encoding in a 1D or 2D symbol. A single bar, space, cell, dot.

EXPOSURE TIME

For digital cameras based on image sensors equipped with an electronic shutter, it defines the time during which the image will be exposed to the sensor to be acquired.

FLASH

Non-volatile memory for storing application and configuration files.

HOST

A computer that serves other terminals in a network, providing services such as network control, database access, special programs, supervisory programs, or programming languages.

IMAGE PROCESSING

Any form of information processing for which the input is an image and the output is, for instance, a set of features of the image.

IMAGE RESOLUTION

The number of rows and columns of pixels in an image. The total number of pixels of an image sensor.

IMAGE SENSOR

Device converting a visual image to an electric signal. It is usually an array of CCD (Charge Coupled Devices) or CMOS (Complementary Metal Oxide Semiconductor) pixel sensors.

INTERNAL ILLUMINATOR

The strobe illuminator that is an integral part of the lens cover for the P-Series™.

IEC

(International Electrotechnical Commission): Global organization that publishes international standards for electrical, electronic, and other technologies.

IP ADDRESS

The terminal's network address. Networks use IP addresses to determine where to send data that is being transmitted over a network. An IP address is a 32-bit number referred to as a series of 8-bit numbers in decimal dot notation (*e.g.*, 130.24.34.03). The highest 8-bit number you can use is 254.

ISO

(International Organization for Standardization): A network of the national standards institutes of several countries producing world-wide industrial and commercial standards.

LED (LIGHT EMITTING DIODE)

A low power electronic light source commonly used as an indicator light. It uses less power than an incandescent light bulb but more than a Liquid Crystal Display (LCD).

LED ILLUMINATOR

LED technology used as an extended lighting source in which extra optics added to the chip allow it to emit a complex radiated light pattern.

MATRIX SYMBOLOGIES (2D CODES)

An arrangement of regular polygon shaped cells where the center-to-center distance of adjacent elements is uniform. Matrix symbols may include recognition patterns which do not follow the same rules as the other elements within the symbol.

RAM

Random Access Memory. Data in RAM can be accessed in random order, and quickly written and read.

SHUTTER OPEN TIME (EXPOSURE TIME)

The time during which the image to be acquired is exposed to the camera's image sensor.

SYMBOL VERIFICATION

The act of processing a code to determine whether or not it meets specific requirements.

TRANSMISSION CONTROL PROTOCOL/INTERNET PROTOCOL (TCP/IP)

A suite of standard network protocols. The TCP governs sequenced data; the IP governs packet forwarding. TCP/IP is the primary protocol that defines the Internet.

VISION PROGRAM MANAGER (VPM)

The Impact software module that provides tools to configure the P-Series™ camera and create vision programs for inspection and control.

Throughout this manual, the name “VPM” is used to refer to the software installed on the camera, either full VPM or VPM Lite.

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