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Find the *Banner Engineering P4ORS* at our website: *Click HERE*

PresencePLUS® P4

quickstart

Models included:

- GEO/GEO 1.3
- EDGE/EDGE 1.3
- BCR/BCR 1.3
- AREA/AREA 1.3
- OMNI/OMNI 1.3



BANNER®

more sensors, more solutions

Printed in USA 02/06 P/N 118000 rev. D

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WARNING . . . Not To Be Used for Personnel Protection

Never use this product as a sensing device for personnel protection. Doing so could lead to serious injury or death.

This product does NOT include the self-checking redundant circuitry necessary to allow its use in personnel safety applications. A sensor failure or malfunction can cause either an energized or de-energized sensor output condition. Consult your current Banner Safety Products catalog for safety products which meet OSHA, ANSI and IEC standards for personnel protection.



CAUTION . . . Electrostatic Discharge

Avoid the damage that electrostatic discharge (ESD) can cause to the Sensor.

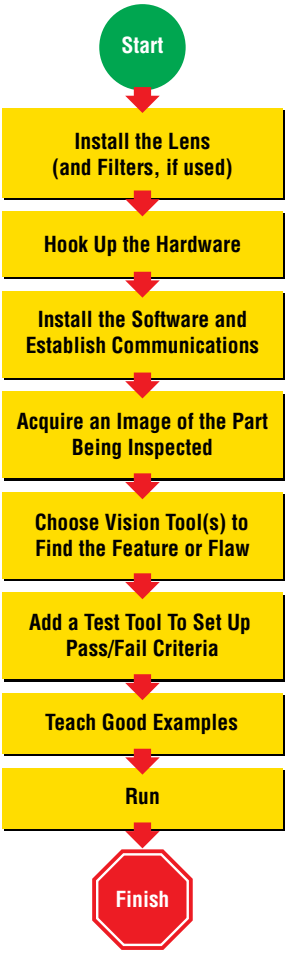
Always use a proven method for preventing electrostatic discharge when installing a lens or attaching a cable.

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Introducing *Presence*PLUS *P4*

The *Presence*PLUS *P4* (or the Sensor) is an easy-to-use vision sensor with advanced visual inspection capabilities. With minimal knowledge of vision, a user can quickly set up the Sensor to run an inspection that tests all products and accurately rejects bad products on a production line.

Inspections are set up using a personal computer (PC) or by activating the Remote Teach input. The Sensor captures images and analyzes them using one or more Vision tools to pass or fail the product. The PC is not required for running inspections after the inspection files have been stored in the Sensor's memory.



Quick Start Overview

This guide is designed to provide – even to those new to vision sensing – the information needed to use this sensor. It provides an overview of the *Presence*PLUS *P4* and illustrates how to easily set up the Sensor to inspect a product. The flow chart at left provides an overview of the process.

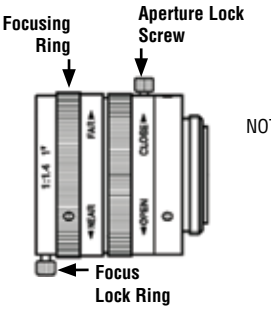
TIPS

For more detailed instructions, refer to the User's Manual on the installation CD.

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step 1

1. Install the lens (and filters, if used). For EDGE, GEO, BCR, AREA, and OMNI any lens may be used. For EDGE 1.3, GEO 1.3, AREA 1.3, BCR 1.3, and OMNI 1.3 use only Megapixel lenses. For non-Banner lenses, follow the lens manufacturer's unpacking and installation instructions.



NOTE: If the lens has a focus lock screw, loosen the screw before focusing the lens. Some lenses also have an aperture lock screw.

Cable Connections

1. If a light will be powered by the Sensor, connect it to the Light connector.

step 2

   a. Caution: If the light is powered by the Sensor, the Sensor power source must be 24V dc.

   b. Caution: This connection is for Banner lights only!

2. If an NTSC monitor is used, connect it to the Sensor via a BNC-to-BNC cable to the NTSC Video connector.
3. Connect the Ethernet cable from your PC to the Sensor at the RJ-45 connector.

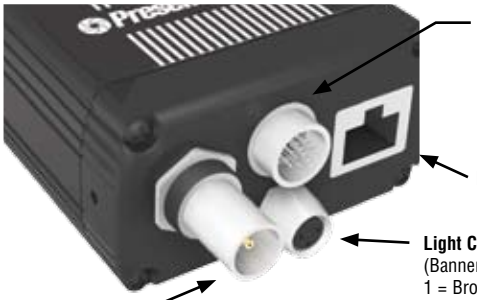
   a. If connecting directly from the PC, use a crossover cable (such as Banner Model No. STPX07).

   b. If connecting the Sensor to a hub or router, use straight cables (such as Banner Model No. STP07) to the Sensor as well as to the PC.

4. Push the connector end of the supplied 12-wire cable onto the 12-pin connector on the Sensor.

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5. Connect the leads on the 12-wire cable to the appropriate locations (see pin assignments below).



12-Wire Cable Pin Assignments

Pin #	Wire Color	Description	Direction
1	Yellow	RS-232 TX	Output
2	Gray	Remote Teach	Input
3	Orange	Product Change	Input
4	Pink	External Trigger	Input
5	Black	Discrete I/O #1	In/Out
6	Red	Discrete I/O #2	In/Out
7	White	Discrete I/O #3	In/Out
8	Light Blue	Discrete I/O #4	In/Out
9	Violet	RS-232 RX	Input
10	Green	RS-232 Signal Ground	Output
11	Blue	Common (Signal Ground)	Input
12	Brown	10-30V dc	Input

12-Wire Cable Models

P4C06 — 2 m (6')
P4C23 — 7 m (23')
P4C32 — 10 m (32')
P4C50 — 16 m (50')
P4C75 — 23 m (75')

Crossover Ethernet Cable (to PC Ethernet Port)

STPX07 — 2.1 m (7')
STPX25 — 7.6 m (25')

or

Standard Ethernet Cable (to PC via Network Hub or Switch)

STP07 — 2.1 m (7')
STP25 — 7.6 m (25')

Monitor Cable (to Video Monitor, optional)

BNC06 — 2 m (6')
BNC15 — 5 m (15')
BNC30 — 9 m (30')

TIPS

The trigger device can be any 10-30V dc photoelectric sensor, or a device with a similar output.

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step 3

PC Configuration

1. Ethernet communication, configure the IP address of your computer.

Typical IP Address:
192.168.0.2

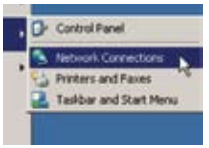


Sensor
Default IP Address
192.168.0.1

Write down the existing address of your PC before changing it: _ _ _ • _ _ _ • _ _ _ • _ _ _

To change the IP address of your PC, do the following:

The following screen captures are from Windows XP. For earlier Windows versions, see Banner's Supplemental Information at http://info.bannersalesforce.com/xpedio/groups/public/documents/trainingjobaid/vr_01_00_e.pdf.pdf



a. Select **Start** > **Settings** > **Network Connections.**



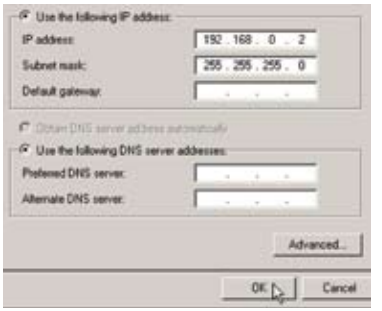
b. Double-click the Local Area Connection used by *Presence*PLUS.



c. Click the **Properties** button.



d. Highlight **Internet Protocol TCP/IP**, and click the **Properties** button.



e. Choose **Use the following IP address**, and:

- Change the IP address to 192.168.0.2
- Change the Subnet mask to 255.255.255.0
- Click the **OK** button.

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2. Install the *Presence*PLUS software.

   a. Insert the Installation CD.

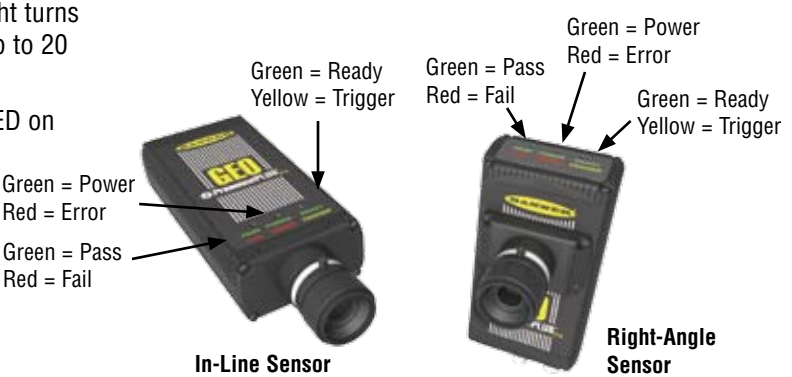
   b. Click **Install PresencePLUS PC Software.**



step 4

Starting the *Presence*PLUS *P4*

1. Power up the hardware and verify that the Power/Error light turns Green. This may take up to 20 seconds.
2. Verify that the yellow LED on the Ethernet port is ON. If it is not ON, see Cable Connections on page 4.



step 5

Launching Software

1. Start the *Presence*PLUS program by clicking

   Start > **Program Files** > **PresencePLUS**.

2. At start-up, *Presence*PLUS will try to communicate with the Sensor.

   If communication with the Sensor is successful, the application will launch and display the Setup or Run screen. If communication was not successful:

   - Verify that the Ethernet cable is the correct type (see Cable Connections on page 4).
   - Verify that the TCP/IP settings are correct (see PC Configuration on page 6).

3. If using an optional NTSC video monitor, verify that the monitor is displaying an image. You may not see an image until the camera is given the first trigger.
4. When the software launches, create an inspection, configure the discrete I/O, and begin running inspections.

NOTE: Initially, all discrete I/O are configured as inputs. Go to the System window to change the discrete I/O. For detailed configuration information, refer to the User's Manual (under the **Help** button in the GUI; see back cover for part number).

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step 6

Software Setup

Use the Main Menu toolbar to navigate the *Presence*PLUS *P4* options. Proceeding from left to right, the buttons in the Menu toolbar step through the process of creating an inspection file.



Inspection Work Flow

1. 

Set up the Sensor, lens, and lighting, to acquire a reference image.

a. Set up the Sensor lens and lighting.

b. Choose Trigger option **Continuous** for a live image.

c. Click **Auto Exposure** to adjust the brightness.

d. Focus the Sensor lens by turning the lens until the Focus Number is maximized.

NOTE: While still in the Setup screen, verify that the trigger works by selecting **External** in the Trigger Options. When in Run mode, the Sensor uses only the external trigger.

e. When you have the desired image, click **Next** to proceed to the Tools screen to acquire the reference image.

2. 

Add tools to the inspection. Build the tools from scratch or add tools from a previous inspection file saved on the PC or the Sensor. To add a Vision tool, click the Tool button. To remove a tool, click the "X" in the lower left corner of the screen.

a. Add **Location tool(s)** to find the target to adjust the following Regions of Interest (ROI) for transitional and rotational changes.

Required **b.** Add **Vision or Bar Code tool(s)** to inspect the part.

c. Add **Measure tool(s)** to create distance measurements from points found.

Required **d.** Add**Test tool(s)** to set the Pass/Fail criteria. (The Vision, Bar Code, and Measure tools are inputs to the Test tool.)

NOTES: • Click **Quick Teach** to automatically set all the selected parameters in the Test tool and proceed to the Run screen, or click **Next** to proceed to the Teach screen, to teach a sample set of good products.

• To manually set min/max parameters in a Test tool, skip **Teach** and go directly to **Run**.

TIPS

Before creating an inspection file, set up the electrical configuration of the external trigger. (Click **System** button, select **Trigger** tab.)

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Tool Options

NOTE: Tool availability depends on *P4* model; see back page.

Tool Name		Function	Description
Location Tools	**GEO Find**	Translation and rotation	Locates the target by searching for a taught pattern and compensates for translation and rotation.
	Locate	Translation and rotation	Finds the edge of the part and compensates for translation and rotation (if selected).
Vision Tools	**GEO Count**	Finds one or more patterns	Locates and counts a taught pattern.
	Edge	Counts and locates edges	Detects and counts transitions between bright and dark pixels. The total number of edges can be counted, and the position of each edge can be found.
	Object	Locates and counts objects, determines midpoints, and measures widths	Detects the edges of dark and bright objects, locates their midpoints, counts dark and bright objects, and measures the width of each dark and bright object.
	Average Gray Scale	Determines presence, absence, and shades of gray	Determines average gray scale value in the Region of Interest (ROI)
	BLOB	Counts/measures areas and counts, sizes, and locates objects	Detects groups of connected light or dark pixels within the ROI and designates them as BLOBs. After BLOBs are found, they can be counted, sized, and located.
Bar Code Reader	**Bar Code**	Decodes bar code markings	Finds and decodes DataMatrix, PDF-417, and Linear bar code types in user-selectable decoder modes, color schemes, and viewer schemes.
Analysis Tools	**Measure**	Measures between points	Measures distance between two prescribed points.
	Test	Logic input/output	Evaluates results of selected Vision and Analysis tools to determine whether an inspection passes or fails. It also performs logical operations and activates outputs.

TIPS

- Each inspection must contain at least one Vision tool and one Test tool.
- Save a backup copy of your inspection to the host PC.

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3. Teach

This screen automatically configures the parameters chosen in the Tools screen.

a. Choose the sample size

b. Click **Start**

c. Trigger the controller with the external trigger device

d. Click **Stop**

e. Click **Next** to proceed to **Run**

Before entering **Run**, save the inspection file to one of the 12 memory locations on the Sensor.

4. Run

Select an inspection to run, and view the results of the inspection.

To select an inspection, (in the Select tab) enable **Software Override** and select the inspection file from the list of stored inspections.

Alternate method: Use **Hardware Input** to select an inspection via Product Change and Product Select lines.

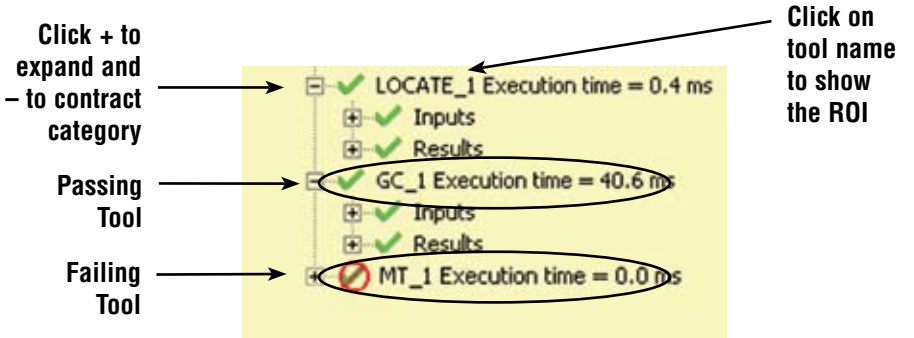
Viewing Results

Display Options

Next Pass	Display only the next passing inspection.
Next Fail	Display only the next failing inspection.
Next RT	Display the next remote teach.
Next RT Fail	Display the next unsuccessful remote teach.
Next	Continuously display inspections.
None	Don't display any inspections.

TIPS

When using the Hardware input, pulse the **Product Change** and **Product Select** inputs to initiate an inspection change. See the User's Manual in the Help menu for complete information.



To begin inspecting, click the **Start** button in the Run screen.

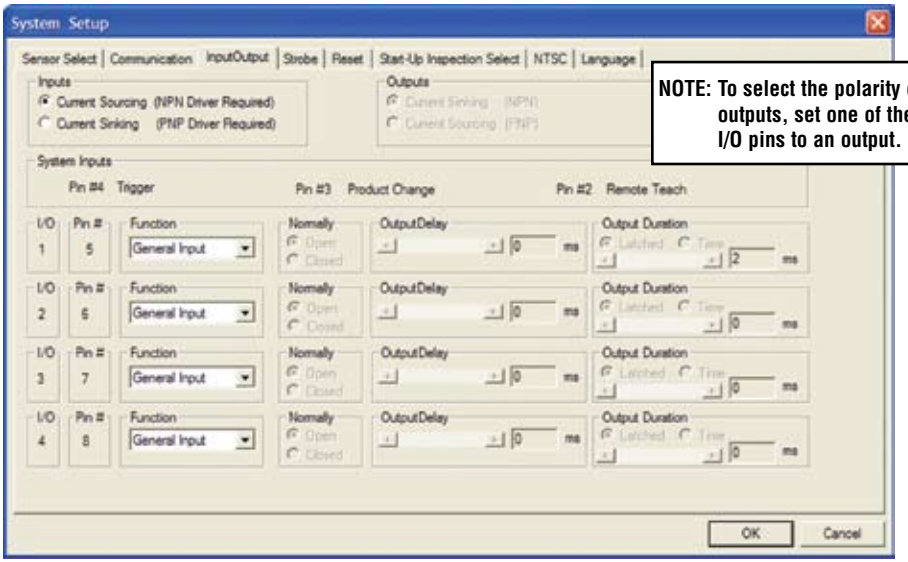
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step 7

System Setup

Use the System Setup screen to change discrete I/O, the communication port, the product change, the strobe output (for external lighting control), the trigger input, and to view diagnostic information.





NOTE: To select the polarity of the outputs, set one of the four I/O pins to an output.

InputOutput Configuration Tab



Save inspections to the Sensor or to a folder on the PC.



Provides: Operation Help
Installation Help
Lens Selection Help
Lighting Help
Error Codes
About (GUI Software version, Sensor Firmware version, Hardware version, Sensor's physical address)

TIPS

Use **Help** > **About** in the GUI to look up the software, firmware, and hardware versions. The information will be helpful if you call Banner for support.

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Maintenance

Maintenance tasks include keeping the hardware free of dust and dirt and updating the *Presence*PLUS software as new versions become available.

Cleaning the Sensor

Regularly remove any accumulated dust or dirt from the Sensor using a soft cloth. If needed, slightly dampen the cloth with a weak solution of neutral detergent. Avoid getting dirt on the Sensor's imager (the area behind the lens). If the imager is dirty, use anti-static compressed air to blow off the dust.

Cleaning the Sensor Lens

Regularly remove dust, dirt, or fingerprints from the lens. Use anti-static compressed air to blow off dust. If necessary, use a lens cloth and lens cleaner or window cleaner to wipe off remaining debris. Do not use any other chemicals for cleaning.

Updating *Presence*PLUS Software

The current version of *Presence*PLUS software is available for download from the Banner website:

www.bannerengineering.com

Click on **Literature/Resources**.

Click on **Software and Electronic Data Sheets**.

Select **PRESENCEPLUSP4** from the Vision Product Line pull-down menu, and click on **Go!**

Download the latest Firmware, PC software, or both.

NOTE: If you upgrade the PC software only, new features may not be available until you load the latest firmware to the Sensor.

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Troubleshooting

Problem	Cause/Solution
• Error Code is displayed on PC.	• A list of error codes and potential causes and solutions are available under Help/About on the *Presence*PLUS software CD.
• Power light is not ON. • Interface cannot connect to Sensor. • No image on monitor.	**Sensor not getting enough power** • Verify that the power supply is 10–30V dc with maximum current of 550 mA (GEO 1.3, EDGE 1.3, AREA 1.3, BCR 1.3, and OMNI 1.3) 500 mA (GEO, EDGE, and AREA) 650 mA (BCR and OMNI) NOTE: If light source is powered by the Sensor, power supply must be 24V dc. • Check the connection to the power supply.
• No image on PC or monitor. • Sensor Ready/Trigger LED is Green. • The software seems to be working correctly, but the image is missing.	**Run display set to "None"** • Verify that the Sensor is receiving triggers. **Sensor not receiving triggers** • If the connections are secure, call a Banner Applications Engineer.*
• Error message, "Failed to capture a full-resolution image. Please try again." • Image is frozen on PC and monitor. • Sensor Power/Error LED is Red.	**Software restart needed or loose connections** • Restart the *Presence*PLUS software. • If the connections are secure, call a Banner Applications Engineer.*
• Image is frozen on PC, but image on monitor properly updates. • Error message, "Failed to capture full-resolution image." • Indicator lights on RJ-45 port are OFF.	**Ethernet connection lost** • Reconnect the cable. • Check the cable for any breaks, then power down and back up. • Replace the cable. • Attempt to close and reopen the *Presence*PLUS software. • If still not resolved, call a Banner Applications Engineer.*
• Focus number does not update. • QuickStart fails. • Errors when saving inspections to the Sensor.	**FTP communications blocked** • Disable TCP/IP Firewall software on the PC.

*Support is available from your local Banner representative or a Banner Applications Engineer. Call, e-mail, fax, or write for support. Applications Engineers are available from 8:00 A.M. to 5:00 P.M. Central Time, Monday through Friday, excluding holidays.

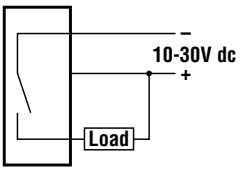
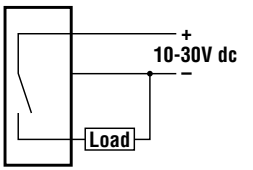
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Specifications

	Right-Angle Housing	In-Line Housing
Models	**GEO:** P4GR **GEO 1.3:** P4G1.3R **EDGE:** P4ER **EDGE 1.3:** P4E1.3R **BCR:** P4BCR **BCR 1.3:** P4BC1.3R **AREA:** P4AR **AREA 1.3:** P4A1.3R **OMNI:** P4OR **OMNI 1.3:** P4O1.3R	**GEO:** P4GI **GEO 1.3:** P4G1.3I **EDGE:** P4EI **EDGE 1.3:** P4E1.3I **BCR:** P4BCI **BCR 1.3:** P4BC1.3I **AREA:** P4AI **AREA 1.3:** P4A1.3I **OMNI:** P4OI **OMNI 1.3:** P4O1.3I
Dimensions *Measured length does not include connectors or cables	**H x W x L:** 55.6 x 66.8 x 124.5* mm (4.9" x 2.63" x 2.2")	**H x W x L:** 34.3 x 66.8 x 147.3* mm (1.35" x 2.63" x 5.8")
Mechanical	**Construction:** Black anodized aluminum **Weight:** Approximately 0.29 kg (0.642 lb.) **Environmental Rating:** IEC IP20; NEMA 1 **Operating Temperature:** 0˚ C to +50˚ C (+32˚ F to +122˚ F) **Maximum Relative Humidity:** 90%, non-condensing	
Display Options	PC or NTSC video (9 m [30'] max. cable length)	
Discrete I/O	1 Remote Teach IN (pin 2) 1 Product Change IN (pin 3) 1 Trigger IN (pin 4) 4 Programmable I/O (pin 5-8) 1 Strobe OUT (light connector pin 4)	
Output Configuration	NPN or PNP software selectable	
Output Rating	150 mA (each) **ON-State Saturation Voltage:** < 1V at 150 mA max. NPN > V+ - 2 volts **OFF-State Leakage Current:** <100 microamps NPN or PNP **NPN Hookup**  **PNP Hookup** 	
Communication	• 1 RJ-45 Ethernet • RS-232 flying leads	

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Specifications, continued

Memory	Stores up to 12 inspection files, depending on the P4 model
Power	**Voltage:** 10-30V dc **Current:** **GEO, EDGE, AREA:** 500 mA max. **BCR, OMNI:** 650 mA max. **GEO 1.3, EDGE 1.3, AREA 1.3, BCR 1.3, OMNI 1.3:** 550 mA max.
Acquisition	**Frames Per Second:** **GEO, EDGE, AREA:** 500 max. **BCR, OMNI:** 48 max. **GEO 1.3, EDGE 1.3, AREA 1.3, BCR 1.3, OMNI 1.3:** 26.8 max. **Image Size:** **GEO, EDGE, AREA:** 128 x 100 pixels **BCR, OMNI:** 640 x 480 pixels **GEO 1.3, EDGE 1.3, AREA 1.3, BCR 1.3, OMNI 1.3:** 1280 x 1024 pixels **Levels of Gray Scale:** 256
Exposure Time	**GEO, EDGE, AREA:** 0.01 ms to 20.47 ms **BCR, OMNI:** 0.1 to 2830 ms **GEO 1.3, EDGE 1.3, AREA 1.3, BCR 1.3, OMNI 1.3:** 0.1 ms to 1670 ms
Imager	**GEO, EDGE, AREA:** 2.56 x 2.00 mm, 3.2486 mm diagonal CMOS; 128 x 100 pixels **BCR, OMNI:** 4.736 x 3.552 mm, 5.9200 mm diagonal CCD; 640 x 480 pixels **GEO 1.3, EDGE 1.3, AREA 1.3, BCR 1.3, OMNI 1.3:** 8.576 x 6.861 mm, 10.9829 mm diaganol CMOS; 1280 x 1024 pixels
Pixel Size	**GEO, EDGE, AREA:** 20 x 20 micrometers **BCR, OMNI:** 7.4 x 7.4 microns **GEO 1.3, EDGE 1.3, AREA 1.3, BCR 1.3, OMNI 1.3:** 6.7 x 6.7 micrometers
Lens Mount	**GEO, EDGE, BCR, AREA, OMNI:** C-mount **GEO 1.3, EDGE 1.3, AREA 1.3, BCR 1.3, OMNI 1.3:** Megapixel C-mount
Certifications	CE

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Models/Tools

PresencePLUS P4 Models	User's Manual Part Number*	Tools										
		Locate	Avg. Gray	BLOB	GEO Find	GEO Count	EDGE	Object	Bar Code Reader	Measure	Test	Comm.
GEO/GEO 1.3	117020	X			X	X				X	X	X
EDGE/EDGE 1.3	120413	X					X	X		X	X	X
BCR/BCR 1.3	122800	X							X	X	X	X
AREA/AREA 1.3	125439	X	X	X						X	X	X
OMNI/OMNI 1.3	125808	X	X	X	X	X	X	X	X (optional)	X	X	X

*Available on enclosed CD or online at www.bannerengineering.com.

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