



the photoelectric specialist

PARTS VERIFICATION ARRAY

Error-proof & streamline your assembly operations.

Take the guesswork out of sequential parts assembly.

With the new Parts Verification Array (PVA) from Banner to light their way, assemblers never need to guess "what's next." The PVA is a light screen sensor that is placed in front of your bins to signal the assembler which bins contain items to pick for a given operation, and in what order to pick them. Use of the PVA can increase quality percentages for assembly operations by reducing missed parts, or parts assembled in the wrong order. This can add up to significant production cost savings in your facility.

Simple, two-component light screen system eliminates the controller.

The uniquely simple PVA system consists of only an asynchronous emitter and receiver which can be easily interfaced to your existing process controller. This simpler yet more advanced system saves time, wiring costs and maintenance, when compared with more complex systems that require a synch wire or controller box. Diagnostic LEDs on each emitter and receiver indicate proper setup or system errors at a glance.

Long 2 m (6.5 ft) range.

The PVA system's long operating range, up to 2 m (6.5'), assures consistent high performance, and compatibility with most existing bin widths and operations. And the wide beam spacing makes alignment easy.



Emitter



Diagnostic LEDs indicate system status

2 m
(6.5 ft.)

Receiver



Job Light indicates next part to pick

Choose from four lengths to fit your bins.

There is no need to replace your existing bins to accommodate the PVA. This compact system, 30 mm wide x 15 mm deep (1.2" x .6") is available in 4 lengths: 100 mm, 225 mm, 300 mm, and 375 mm, (4", 9", 12", and 15") to fit many heights and configurations of bins.



100 mm
4"



225 mm
9"

Simple & intuitive, yet advanced & reliable.

Intuitive, highly visible job lights eliminate miscommunication.

Even the most complex assembly process becomes natural and simple with the two highly-visible job indicator lights on either side of the emitter and receiver to lead assemblers through the correct picking order the first time and every time. Typical communication barriers such as technical and/or language constraints can also be significantly reduced with the implementation of a PVA system, due to its completely visual means of communication. The job lights are remotely controlled by your logic controller to initiate action with a user-selectable steady or blinking green “pick” light.

Increase worker efficiency.

Along with “error-proofing” the assembly process, the PVA can also increase worker efficiency by verifying at all times where an assembler last left off during the assembly process, even after a break or work stoppage. The PVA system will allow your workforce to more quickly learn and maintain new assembly “pick” procedures. The system also reduces assembler stress, inspection time and reworks.



Emitter

Green indicates POWER ON/SYSTEM OK
(flashes to indicate failure)

Red or off indicates frequency selected



Receiver

Green indicates POWER ON/SYSTEM OK
(flashes to indicate failure)

Yellow indicates output state

Advanced diagnostics keep you better informed.

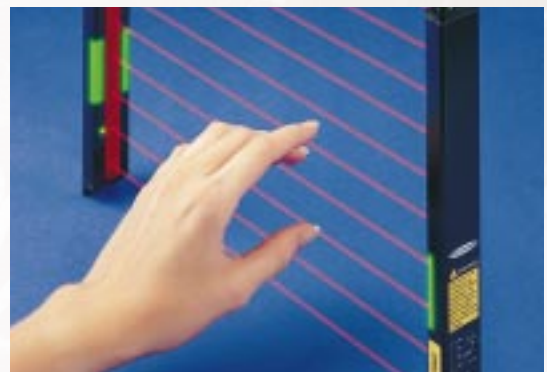
The PVA system features advanced diagnostics to keep operators and supervisors constantly aware of its operating status. The green LED, on both the emitter and receiver, indicates POWER ON and SYSTEM OK (flashes to indicate emitter or receiver failure). The emitter's red LED indicates the selected frequency, and the receiver's yellow LED indicates output state. Because sensors on all bins are active at all times, you can program your process controller logic to trigger an alarm for the assembler and/or supervisor if a part is accidentally pulled from an incorrect bin.

Dual frequency eliminates interference.

The PVA system allows you to choose between two frequencies for each emitter/receiver pair. This allows you to place multiple pairs of PVA sensors in close proximity without crosstalk-related problems. This means no loss of performance or false triggering when in large, multiple-unit installations.

25 mm beam spacing assures reliable operation.

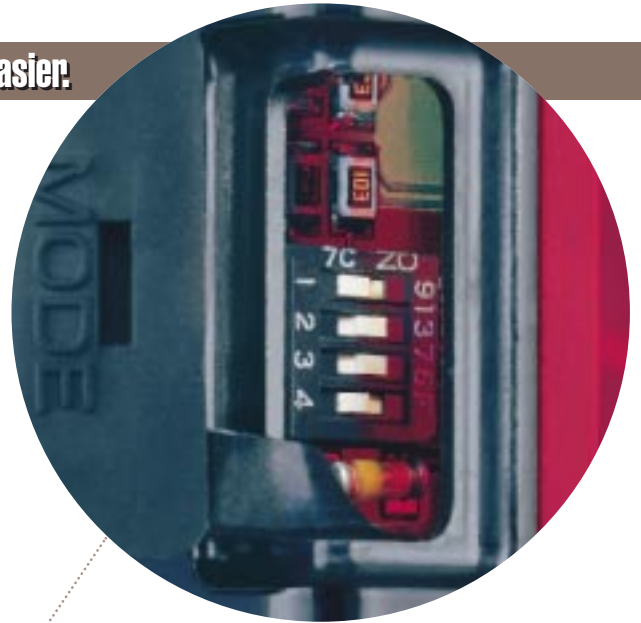
The PVA system's 25 mm (1") beam spacing for all models provides a minimum resolution of 35 mm (1.4"), making it reliable for sensing even the smallest hands. And the wide beam pattern makes alignment much easier than many other systems.



A straightforward system that makes your job easier.

Simple programming using your existing process controller.

Installation of the PVA system is easy and straightforward. You simply connect the PVAs to your process controller and program the desired task sequence. To further assure defect reduction, you can also program your controller to trigger an alarm if a part is pulled from an incorrect bin.



DIP switches for easy setup.

Easy DIP-switch adjustments on the PVA system allow you to choose frequency A or B, light or dark operate, steady or flashing job light indicators, and either +5 to 30V dc or 0 to 2V dc job light control input. Snap-out cover protects DIP switches and remains tethered to the PVA when removed.

Easy mounting with hardware included.

The PVA emitters and receivers are small and lightweight and are as easy to mount as they are to use. Each sensor comes with two stainless steel brackets with fasteners for fast installation. If your bins are supported by standard 28 mm pipe (such as CREFORM®), our optional “C”-shaped molded brackets (Model SMBPVA2, set of 4) snap directly to the pipe without screws. The PVA mounts to the bracket with supplied hardware.

Unterminated or quick-disconnect cable.

The PVA system comes with a 2 m (6.5') cable. You can choose either the unterminated style, or a quick-disconnect with 4-pin Euro-style connector.



Optional brackets snap onto 28 mm pipe.



A proven solution for vehicle assembly.

Error-proof your assembly line.

The PVA system was created to reduce errors and increase speed in sequential automotive assembly operations by reducing assembly mistakes. The number of vehicles assembled with a part missing, or parts attached in the wrong order, decreases when assemblers use this system to guide each action and constantly verify their place in the task sequence, eliminating the need to re-orient after breaks or distractions.

Improve vehicle quality.

Use of the PVA system increases vehicle quality percentages. Manufacturers are discovering that the ability to achieve zero defects in vehicles is well within reach when this system is implemented at all critical assembly stations, leading the assembler to the correct bin each and every time.



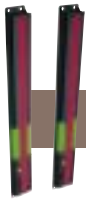
Reduce manufacturing costs.

Use of the PVA system reduces the time spent on training, quality inspections, and rework, in addition to lowering the reject and scrap percentages. This totally visual communication system is a worldwide solution that eliminates training obstacles such as language barriers and technical inexperience, which makes it much easier to employ the assembly workforce. This reduces manufacturing costs and results in higher plant profitability.



PVA Protective Shield.

Designed specifically for automotive assembly operations, this rugged metal shield protects the unit from impact by parts being removed from bins and prevents damage due to fork lifts or other moving machinery. PVA emitters or receivers slide easily into the heavy-duty zinc-plated steel shield.



Parts Verification Array Model Selection & Accessories

Emitter/Receiver Pairs*





■ Models with Underterminated cable

■ Models with Euro-style Quick-disconnect

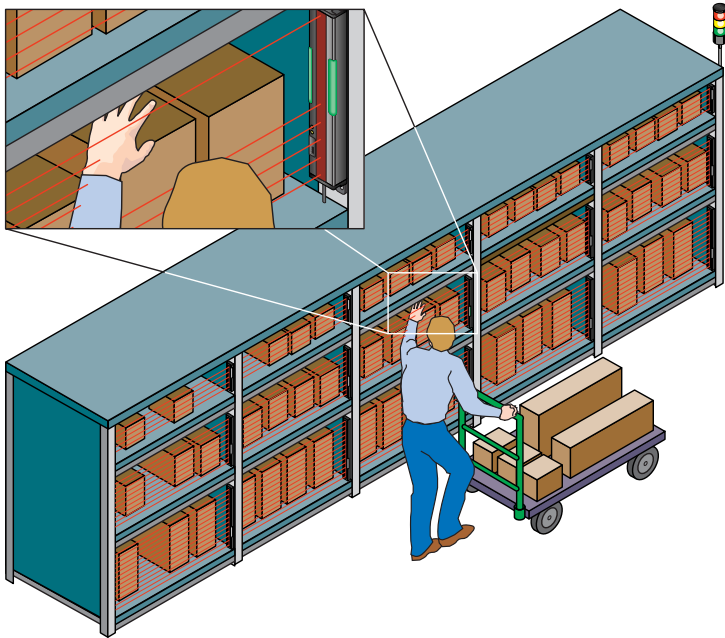
System Height/Beams	Model Number	Part Number	Cable	Supply Voltage	Job Light Input	Receiver Output	Minimum Resolution
100 mm (4") 5 Beams	PVA100N6	52902	2 m (6.5') Underterminated	12 to 30V dc	0V dc	NPN (Sinking)	35 mm
100 mm (4") 5 Beams	PVA100P6	52901	2 m (6.5') Underterminated	12 to 30V dc	+5 to 30V dc	PNP (Sourcing)	35 mm
100 mm (4") 5 Beams	PVA100N6Q	52904	2 m (6.5') Euro-style Quick-disconnect	12 to 30V dc	0V dc	NPN (Sinking)	35 mm
100 mm (4") 5 Beams	PVA100P6Q	52903	2 m (6.5') Euro-style Quick-disconnect	12 to 30V dc	+5 to 30V dc	PNP (Sourcing)	35 mm
225 mm (9") 10 Beams	PVA225N6	52906	2 m (6.5') Underterminated	12 to 30V dc	0V dc	NPN (Sinking)	35 mm
225 mm (9") 10 Beams	PVA225P6	52905	2 m (6.5') Underterminated	12 to 30V dc	+5 to 30V dc	PNP (Sourcing)	35 mm
225 mm (9") 10 Beams	PVA225N6Q	52908	2 m (6.5') Euro-style Quick-disconnect	12 to 30V dc	0V dc	NPN (Sinking)	35 mm
225 mm (9") 10 Beams	PVA225P6Q	52907	2 m (6.5') Euro-style Quick-disconnect	12 to 30V dc	+5 to 30V dc	PNP (Sourcing)	35 mm
300 mm (12") 13 Beams	PVA300N6	52910	2 m (6.5') Underterminated	12 to 30V dc	0V dc	NPN (Sinking)	35 mm
300 mm (12") 13 Beams	PVA300P6	52909	2 m (6.5') Underterminated	12 to 30V dc	+5 to 30V dc	PNP (Sourcing)	35 mm
300 mm (12") 13 Beams	PVA300N6Q	52912	2 m (6.5') Euro-style Quick-disconnect	12 to 30V dc	0V dc	NPN (Sinking)	35 mm
300 mm (12") 13 Beams	PVA300P6Q	52911	2 m (6.5') Euro-style Quick-disconnect	12 to 30V dc	+5 to 30V dc	PNP (Sourcing)	35 mm
375 mm (15") 16 Beams	PVA375N6	52914	2 m (6.5') Underterminated	12 to 30V dc	0V dc	NPN (Sinking)	35 mm
375 mm (15") 16 Beams	PVA375P6	52913	2 m (6.5') Underterminated	12 to 30V dc	+5 to 30V dc	PNP (Sourcing)	35 mm
375 mm (15") 16 Beams	PVA375N6Q	52916	2 m (6.5') Euro-style Quick-disconnect	12 to 30V dc	0V dc	NPN (Sinking)	35 mm
375 mm (15") 16 Beams	PVA375P6Q	52915	2 m (6.5') Euro-style Quick-disconnect	12 to 30V dc	+5 to 30V dc	PNP (Sourcing)	35 mm

*Emitters and receivers are also available separately. Contact factory or your Banner distributor for ordering information.

PVA Accessories

	Item	Model Numbers	Part Number	Quantity	Size
	L-shaped Stainless-Steel Brackets & Fasteners (Standard with PVA)	SMBPVA1	56884	2 pair	NA
	C-shaped Molded Brackets (Fit 28 mm pipe such as CREFORM®)	SMBPVA2	54451	2 pair	NA
	PVA Protective Shield	SMBPVA5 SMBPVA10 SMBPVA13 SMBPVA16	56500 56809 56810 56811	2 2 2 2	4" 9" 12" 15"
	Quick-Disconnect Mating Cable (For mating to 4-pin Euro-style connector)	MQDC-406 MQDC-415 MQDC-430	45136 26850 27142	1 1 1	2 m 5 m 9 m

Parts Verification System Application, Specifications & Dimensions



WAREHOUSE ORDER PICKING

Objective: To speed order picking time and eliminate picking errors.

Sensor: PVA (In pairs of any of four lengths)

Operation: Manual warehouse order picking operations become efficient, semi-automated procedures, using pairs of PVA sensors to scan across each bin opening or shelf location. The system controller (typically a computer) issues an order picking command by lighting the PVA job lights at all of the desired locations. When a correct item is removed, the job light at that location goes OFF. If multiple items are required from one location, the job light stays ON until the correct number of items are removed. Selection of an item from an incorrect bin (or the incorrect number of items from a correct bin) prompts the light tower to flash.

Parts Verification Array General Specifications and Dimensions

Supply Voltage and Current: 12 to 30V dc (10% maximum ripple) at less than 62 mA for the emitter and 50 mA for the receiver (exclusive of load).

Sensing Height: 100 mm, 225 mm, 300 mm, 375 mm depending on model length

Sensing Range: 2 m (6.5')

Beam Spacing: 25.0 mm (0.98")

Sensing Resolution: 35 mm (1.4") minimum diameter object

Status Indicators: Emitter: One green LED to indicate power ON. One red LED to indicate frequency B selected. Receiver: One green LED to indicate power ON. One yellow LED to indicate output state.

Emitter and Receiver: Both have two highly visible green "job lights" which turn ON and OFF by applying an external signal through the white "job input" wires. These lights can be programmed for steady burn or flashing through internal DIP switches.

Output Configuration: Receivers have one solid-state dc output, which can be programmed through internal DIP switches for light or dark operate. Models PVA . .N6R have current sinking (NPN) open-collector transistor. Models PVA . .P6R have current sourcing (PNP) open-collector transistor.

Output Response Time:

Sensor Size	Standard Response	Response w/Crosstalk from other units
100 mm (4")	12.5 ms	20 ms
225 mm (9")	25 ms	40 ms
300 mm (12")	32.5 ms	52 ms
375 mm (15")	40 ms	64 ms

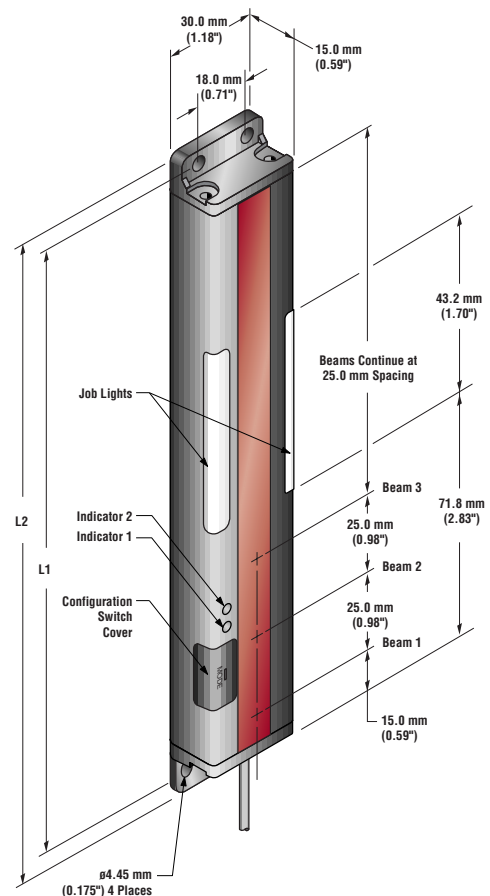
Output Rating: 150 mA maximum

Output Protection: Protected against false power-up and continuous overload or short circuit of outputs

Construction: Black painted aluminum housing; acrylic lenses, VALOX® end-caps; thermoplastic elastomer programming switch cover; stainless steel mounting brackets and hardware.

Environmental Rating: NEMA 2; IEC IP62

Operating Temperature: 0° to 50°C (32° to 122°F)



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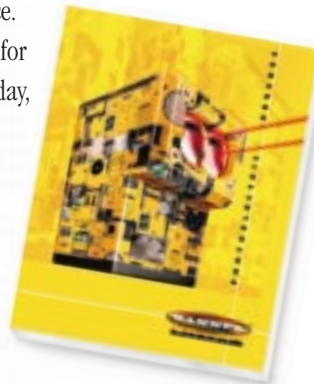
For more information or applications assistance:



The Banner Sensor Catalog and CD ROM.

The industry's most complete catalog; over 700 pages of detailed product and technical information on over 12,000 photoelectric and ultrasonic sensors. Simple selection charts make specifying the correct sensors easier than ever. Additional technical information includes hook-up diagrams and application notes, plus complete specifications, glossary of terms and data reference.

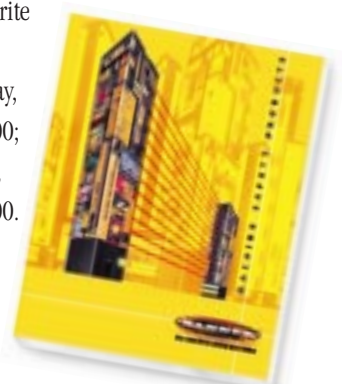
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The Banner Safety Products Catalog and CD ROM.

A complete catalog of Machine Safety Products including Banner's extensive line of safety light screen controllers, emitters and receivers, including MICRO-SCREEN™, MINI-SCREEN®, MACHINE-GUARD, MULTI-SCREEN® Dual Systems and PERIMETER-GUARD Systems. Also included are Banner's two-hand anti-tiedown controls and full line of safety interlock switches, E-stop relays and safety relays.

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