

Image Processing

Sensor and System Solutions from a Single Source

Sheet verification, profile comparison, range monitoring, and high-precision measurement—these are just a few of the applications that can be implemented with image processing. From easy-to-integrate vision sensors to high-performance vision systems, Pepperl+Fuchs offers all of the solutions required in an industrial environment.

Light Section Sensors from Pepperl+Fuchs

The light section process uses the triangulation principle to detect and measure surface profiles. Pepperl+Fuchs offers light section sensors for a range of applications, including profile detection, profile calibration, and field monitoring.

Vision Sensors from Pepperl+Fuchs

Our vision sensors are specifically designed for easy installation and operation and can be easily integrated into new and existing systems. The use of switching outputs and teach-in mean no additional programming or software is required in most cases.

Vision Systems from VMT

Our subsidiary VMT Vision Machine Technic Bildverarbeitungssysteme GmbH supplies individual turnkey image processing and laser sensor systems for all industrial sectors. As part of the powerful Pepperl+Fuchs Group, VMT offers top-of-the-range technology combined with the highest level of investment security.



More information is available at
www.pepperl-fuchs.com/fa-vision





Image Processing

Complex Technology Made Simple

At Pepperl+Fuchs, our goal is to make image evaluation technology as easy to use and integrate as a sensor. Vision sensors with switching outputs and teach-in make it easier than ever before to benefit from this complex technology.



Light Section Sensors with SmartRunner Technology

By combining the reliable light section method for height profile detection with a 2-D vision sensor, Pepperl+Fuchs has produced highly specialized sensors tailored to specific applications. Our SmartRunner technology transforms complex profile data into easy-to-process switching signals—making these sensors exceptionally simple to integrate and use.

Your Benefits at a Glance

- A unique combination of the light section process and 2-D vision sensors with integrated LED lighting opens up many new fields of application
- Application-specific sensors—for direct and optimal use in the application
- Quick integration into the overall process by transforming complex measurement data into easy-to-process switching signals
- Simple commissioning through parameterization via Data Matrix control codes or teach-in

Typical Applications

SmartRunner Matcher—the specialist for profile comparisons:

- Presence and completeness checking on one or multiple components
- Quality control in packaging technology
- Correctness and position checking on components

SmartRunner Detector—the specialist for high-precision monitoring

- Protection of sensitive components in machines
- Checking for overlapping of components
- Overhang monitoring even when stationary



Vision Sensors for Misfed Sheet Detection

The sheet identification sensor allows quick and easy monitoring of the correct sheet sequence, e.g., in collating, folding, and binding machines. For the first time, the BIS510 combines code recognition and image comparison in a single sensor, promising outstanding flexibility and cost efficiency.

Your Benefits at a Glance

- Fully automated teach-in of reference sheets for exceptional ease of use and shorter changeover times
- Flexibility and cost efficiency through the combination of image comparison and code recognition in a single sensor
- Increased efficiency with reading speeds of 4 m/s at 10 sheets/s
- Outstanding process reliability even on reflective surfaces through innovative polarization filter technology

Typical Applications

- Misfed sheet detection in collating, folding, and binding machines

Other Application-Specific Vision Sensors

Image processing is used in a wide range of fields. In addition to the sensors described above, further application-specific versions can be found in the Identification (page 44) and Positioning Systems (page 66) sections.

Image Processing

Contents



**Vision Sensor for
Sheet Verification-**
Page 323



**SmartRunner
Matcher**
Page 324



**SmartRunner
Detector**
Page 325

Vision Sensor for Sheet Verification



Standard Technical Data

Detection range	52 mm
Light type	White LED
Interface	Ethernet
Output type	PNP
Operating elements	Push-button
Voltage type	DC
Operating voltage (min)	24 V
Operating voltage (max)	24 V
Connection type	M12 connector plug
Degree of protection	IP67
Housing length L	53.3 mm
Housing width W	70 mm
Housing height H	70 mm

For detailed data and description, see the datasheet. Further products can be found online at www.pepperl-fuchs.com.

Model number

BIS510P-F201A-60

Highlights

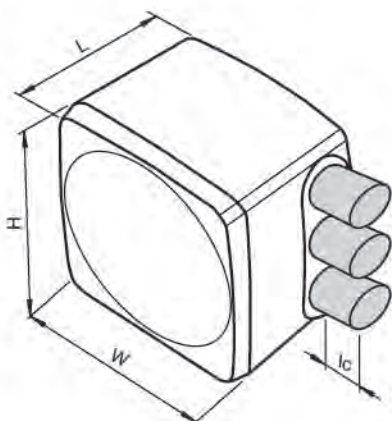
- Monitoring correctness of sheet sequences, e.g., in collating and folding machines, based on image comparison or barcode/data matrix code reading
- Automatic teach-in of reference image
- Permanent storage of the reference image
- Connection of a trigger sensor (ML4.2)
- Error image memory facilitates troubleshooting
- Ethernet interface for fast image and data communication
- Simple integration into graphic user interfaces
- Free PC software simplifies commissioning

Brief Description

An unprinted page in a book is irritating. If the reader finds that important information is missing, they will stop reading the book. A distorted page in an illustrated book will also devalue the copy. But while these kinds of incidents are annoying, they are not as serious as the incorrect insert being placed inside a package of medicine. In all these scenarios, the root cause of the issue is that the bookbinding company has folded, collated, or bound the wrong sheet. For this reason, sheet errors must be reliably detected and rectified as early as possible. Powerful image processing technology can handle this task reliably and with minimum effort from the user. With their many years of experience, solutions from Pepperl+Fuchs and Optigraf are designed for outstanding reliability and simple operation.

Accessories

PCV-MB1	Mounting bracket for PCV* read head
V15-G-2M-PUR	Single-ended female cordset, M12, 5-pin, PUR cable
V15-G-2M-PUR-V15-G	Cordset, M12 to M12, PUR cable, 5-pin
V15-G-5M-PUR	Single-ended female cordset, M12, 5-pin, PUR cable
V15S-G-5M-PUR-ABG	Single-ended male cordset, M12, 5-pin, shielded, PUR cable
V19-G-2M-PUR-ABG	Single-ended female cordset, M12, 8-pin, shielded, PUR cable
V19-G-5M-PUR-ABG	Single-ended female cordset, M12, 8-pin, shielded, PUR cable
V19-G-ABG-PG9	Single-ended female cordset, M12, 8-pin, shielded, field-attachable





SmartRunner Matcher



Standard Technical Data	
Light type	Red laser diode
Interface	RS-485
Output type	PNP
Operating elements	Push-button
Operating voltage (min)	19.2 V
Operating voltage (max)	28.8 V
Connection type	M12 connector plug
Degree of protection	IP67
Housing length L	55 mm
Housing width W	38 mm
Housing height H	85 mm

For detailed data and description, see the datasheet. Further products can be found online at www.pepperl-fuchs.com.

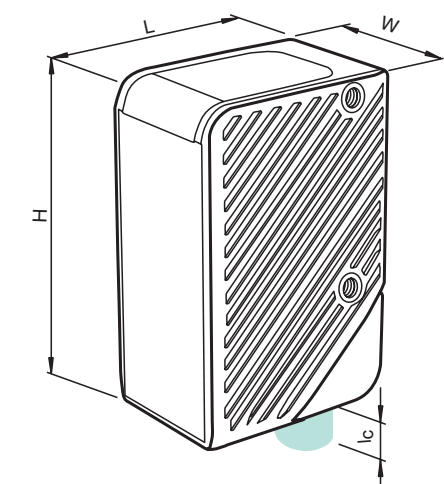
Model number	Measuring range	Resolution
VLM350-F280-2E2-1000	X = 40 mm ...160 mm; Z = 60 mm ...350 mm	X > 0.44 mm; Z > 0.4 mm at 60 mm read distance
VLM350-F280-R4-1001	X = 40 mm ...160 mm; Z = 60 mm ...350 mm	X > 0.44 mm; Z > 0.4 mm at 60 mm read distance
VLM350-F280-R4-1002	X = 40 mm ...160 mm; Z = 60 mm ...350 mm	X > 0.44 mm; Z > 0.4 mm at 60 mm read distance
VLM350-F280-R4-1101	X = 40 mm ...160 mm; Z = 60 mm ...350 mm	X > 0.25 mm; Z > 0.2 mm at 60 mm read distance
VLM700-F280-R4-1102	X = 60 mm ... 300 mm; Z = 100 mm ... 700 mm	X > 0.44 mm; Z > 0.4 mm at minimum read distance

Highlights

- Presence and completeness checking on one or multiple components
- Quality control in packaging technology
- Correctness and position checking on components

Brief Description

By combining the reliable light section method for height profile detection with a 2-D vision sensor, Pepperl+Fuchs has produced highly specialized sensors tailored to specific applications. Our SmartRunner technology transforms complex profile data into easy-to-process switching signals—making these sensors exceptionally simple to integrate and use.



Accessories	
PCV-USB-RS485-Converter Set	USB to RS 485 interface converter
V19-G-5M-PUR-ABG	Single-ended female cordset, M12, 8-pin, shielded, PUR cable
V19-G-BK0,6M-PUR-U-V1-G-SRMAT	Cordset for SmartRunner Matcher, M12 to M12, 8/4-pin, PUR cable
VLX-F231-B17	Interface module with PROFINET interface for SmartRunner
VLX-F231-B25	Interface module with EtherNet/IP interface for SmartRunner
VLX-F231-B6	Interface module with PROFIBUS interface for SmartRunner



SmartRunner Detector



Standard Technical Data	
Light type	Red laser diode
Interface	RS-485
Output type	PNP
Operating elements	Push-button
Operating voltage (min)	19.2 V
Operating voltage (max)	28.8 V
Connection type	M12 connector plug
Degree of protection	IP67
Housing length L	55 mm
Housing width W	38 mm
Housing height H	85 mm

For detailed data and description, see the datasheet. Further products can be found online at www.pepperl-fuchs.com.

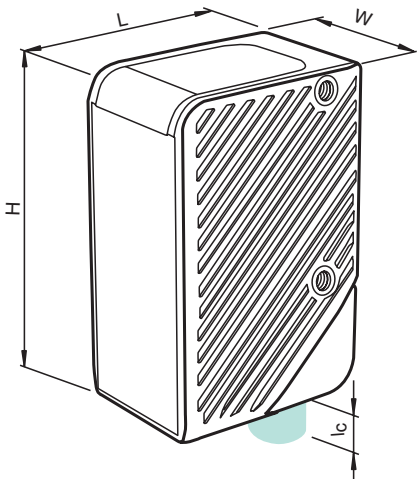
Model number	Object size
VLD700-F280-2E2-1000	> 0.1 mm at minimum read distance

Highlights

- Protection of sensitive components in machines
- Checking for overlapping of components
- Overhang monitoring even when stationary

Brief Description

By combining the reliable light section method for height profile detection with a 2-D vision sensor, Pepperl+Fuchs has produced highly specialized sensors tailored to specific applications. Our SmartRunner technology transforms complex profile data into easy-to-process switching signals—making these sensors exceptionally simple to integrate and use.



Accessories	
PCV-USB-RS485-Converter Set	USB to RS 485 interface converter
V19-G-5M-PUR-ABG	Single-ended female cordset, M12, 8-pin, shielded, PUR cable
V19-G-BK0,6M-PUR-U-V1-G-SRDET	Cordset for SmartRunner Detector, M12 socket 8-pin to M12 plug 4-pin, PUR cable, black
VLX-F231-B17	Interface module with PROFINET interface for SmartRunner
VLX-F231-B25	Interface module with EtherNet/IP interface for SmartRunner
VLX-F231-B6	Interface module with PROFIBUS interface for SmartRunner