Black Widow Systems

100% Inspection of Continuous Materials

Manufacturers of continuous process materials such as textiles, plastic films, printed materials, and paper, are under growing pressure to provide consistent quality. Many users of these products are demanding that suppliers formalize quality procedures by adopting ISO 9000. These more stringent requirements have led to a need for 100% inspection. Sampling-based inspection systems miss many defects, and are no longer adequate.

Black Widow Systems from Datacube have the power to provide true 100% inspection of continuous materials, or webs, at production rates. These systems economically detect and classify a variety of defects from quickly moving webs, to minimize scrap and downtime, and enhance quality. They are modular and scalable, have ruggedized enclosures, and are based on open standards.

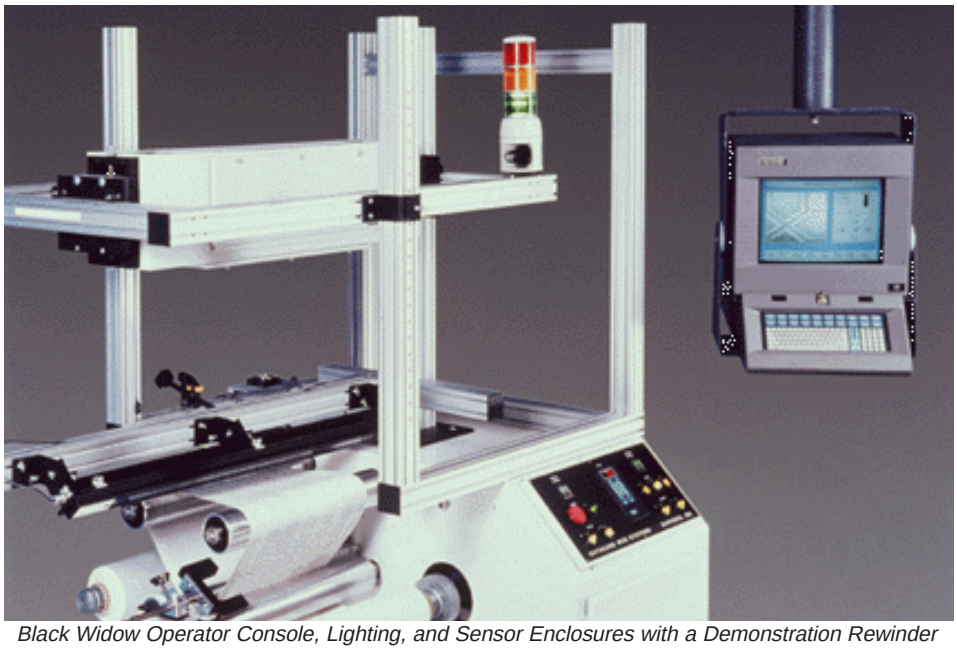
Black Widow Systems

Black Widow Systems consist of a control cabinet, a separate operator console, enclosures for cameras and lighting, and an encoder/interface unit. The enclosures, built to NEMA 12 standards, are ruggedized to withstand hostile manufacturing environments.

The system cabinet houses image processing and system boards, a defect recorder, I/O hardware, a real-time operating system, and inspection software.

A separate PC-based operator console has a Windows NT graphical user interface so operators can easily interact with the system. The console can be located near the line or up to 30 meters away to meet the requirements of different environments. Its full gray-scale capability allows the operator to continuously view the web on the display.

Black Widow's cameras and lighting are precise and flexible to simplify setup and integration, yet rugged enough to withstand the demands of the manufacturing environment. The mounting mechanisms for the lighting enclosure, camera enclosure, and individual line-scan cameras can each be precisely positioned to optimize system performance.



Black Widow Operator Console, Lighting, and Sensor Enclosures with a Demonstration Rewinder

Black Widow Systems derive their power from Datacube's proven pipeline processing technology. Its highly deterministic, real-time operating system meets the challenge of reacting to a continuous stream of sensor data with the speed necessary to detect defects or grade products and provide true 100% inspection at production rates.

A unique feature of Black Widow Systems is the presence of defect recorders. This is an invaluable tool for trouble shooting, allowing image defects to be archived for later analysis.

Open Standards

Black Widow Systems are built on open standards, making them easy to link to other equipment. The Windows NT interface is DDE compliant, allowing a variety of options for data usage. Black Widow utilizes OLE 2.0, and TCP/IP, to easily interface with a variety of industry-standard statistical process control packages, factory networks, cell controllers, or directly to PLCs.

Because the needs of users change, Black Widow Systems are scalable. Additional cameras and image processing hardware can usually be installed on-site, to economically increase the precision of a system.

Web Inspection Solutions

Black Widow's I/O is “locked” to web motion with an encoder interface. Real-time ejection or marking of defects can be accomplished with great precision. It utilizes OPTO-22 compatible modules to provide exceptional flexibility. This allows the integrator to easily deal with a variety of environmental variables.

Powerful and versatile defect reporting provides on-demand review of defect trends and classes, shift roll, and product grading reports. Data can be saved to multiple file formats, transferred across a network to a host, or elsewhere, as required.

Built upon Datacube’s hundreds of man-years of image processing experience, Black Widow Systems provide exceptional, reliable precision, and effective solutions for a wide variety of continuous process web inspection applications.

- 100% inspection of textiles, plastic films, printed materials, paper and pulp and other continuous materials at production rates
- Scalable design simplifies interfacing and on-site upgrades
- Ruggedized, ridged enclosures for secure multiple camera mounting
- Adjustment mechanisms for sensors and lighting simplify integration and enhance precision
- Open systems design

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Black Widow Systems

Overview

- Powerful and versatile defect reporting
- Deterministic Input/Output
- Scalable architecture
- Ruggedized enclosures built to NEMA 12 and/or NEMA 4 standards
- State-of-the-art man/machine interface
- Advanced parallel pipeline processor
- Precise positioning of lighting unit, sensor unit, and individual sensors
- Open systems standards

System Performance

Open Systems

- Communications
  - TCP/IP
  - RS-232
  - RS-422
- 6U VME chassis allows integration of a variety of third-party hardware
- POSIX-compliant real-time operating system provides deterministic response to real-world events

Scalable Architecture

- Single or double-sided inspection
- Systems can be configured with 1 to 64 cameras
- Power to handle inspection of very wide and high-speed webs
- Field-upgradable design prolongs life of system
  - Resolution and processing speed can be upgraded to comply with future process needs
  - Backward-compatible object-oriented software
- Advanced parallel pipeline processor
  - Based on advanced architecture designed for military needs
  - Multiple inspection algorithms can occur in parallel
  - Standard or neural classification engines
  - Scalable design allows multiple boards for more data-intense applications

Deterministic Input/Output

- Modular OPTO-22 I/O allows user to tailor system to local process requirements
- Exclusive web locked I/O provides precise rejection of defects

Operator Interface

- Live video display of web under inspection
- Open systems approach
- Object-oriented software based on Visual C++
- Multi-tasking multi-threaded operation
- TCP/IP DDE OLE 2.0 allows easy connection to third-party SPC packages, factory networks, standard PLC's
- Based on Windows NT Operating Systems
- Provides operator with real-time defect and trend information
- Renders data graphically to allow operator to respond to process changes quickly and efficiently
- Operations controlled through graphical environment—easy to use, yet very powerful
- Real-time display of defects
- Can be tailored to mimic customer's process or environment

Operator Interface includes gray-scale display and can be positioned close to or away from the web

Defect Reporting

- On-demand review of defect trends and classes
- Advanced Reporting Options
  - Shift and Roll Reports
  - Product Grading Reports
  - Data can be saved to multiple file formats
  - Data can be transferred across the network to a host, or elsewhere, as required

Sensors and Lighting

Illumination Subsystem

- High output fluorescent or fiber optic system
- Closed loop control by image processing system
- Automated illumination setup for different products
- Precise positioning mechanism simplifies integration and enhances accuracy

Sensor Array Subsystem

- Precise optical alignment of multiple sensors across the web
- CAM-LINK interface allows video transport up to 30 meters from system enclosure
- Individual sensors can be precisely aligned to ensure exceptionally accurate inspection of very wide webs

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