Life Sciences Solutions

BANNER®
more sensors, more solutions

With a commitment to advancing technology and enhancing the efficiency of life science applications, Banner Engineering is a trusted partner for organizations that strive for excellence in research, development, and production. Banner offers a diverse portfolio of solutions to optimize processes, improve productivity, and ensure standards compliance for lab automation, pharmacy automation, medical device design, medical manufacturing, and other critical areas in the life science industry.

High Precision

Rugged

Kitting

IO-Link®
Smart Technologies

PRO
Pro Editor Software

Label Customization

Connectivity Customization

55+ Years Expertise and Personable Service

10,000+ Innovative, High-Quality Products

30+ International Locations on Five Continents

Innovative Solutions and Technologies for the Life Sciences Industry

Industry Experience

For over five decades, customers have trusted Banner with their business, relying on the quality and performance of our products and services, as well as our expertise and integrity. We will continue to provide our customers with superior service, exceptional products, and innovative solutions that help them achieve their goals.

Lighting and Indication

Banner offers specialized lighting and indication products to support the dynamic nature of the life sciences industry. Life science professionals working in research, clinical labs, and pharmaceutical labs require the appropriate lighting to perform their duties at the highest level. Medical device and lab professionals require clear indication of machine status, liquid levels, operator task direction, and task completion.

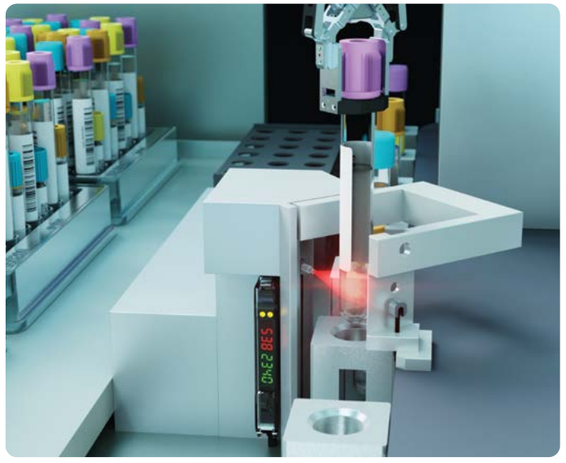
Innovative Sensor Technologies

From precise detection and measurement of critical liquid media to ensuring automated movements happen seamlessly, Banner sensors are engineered to deliver unparalleled accuracy and reliability.

Customized Solutions

Banner offers customizable solutions to address specific challenges faced by customers. Our team of experts collaborates with clients to develop tailored solutions for their unique requirements, contributing to enhanced efficiency and success.

Featured Segments

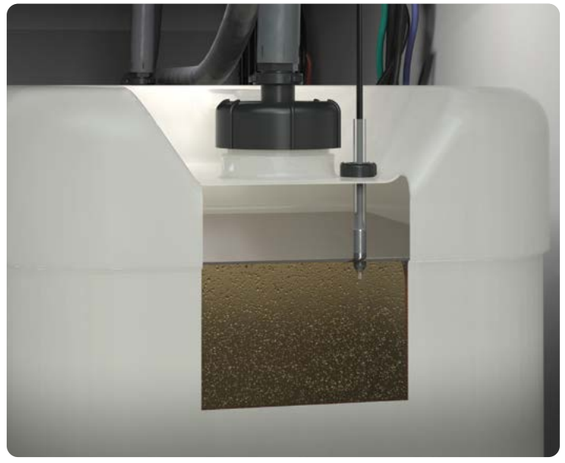


Lab Automation

Banner has superior capabilities to provide solutions for companies operating in the laboratory automation, bio-storage, and automated diagnostic industry. From compact photoelectric and laser sensors capable of detecting sample tubes, pipets, microtiter trays and sample dishes to LED lighting enclosed in housings suitable for cleanroom environments, we are able to draw on the most comprehensive collection of sensors, vision sensors, safety, and lighting products to provide solutions for all areas of lab automation. Learn more on page 8.

Pharmacy Automation

Banner Engineering has extensive experience solving applications in pharmacy automation. Our products are used to solve a number of automation applications, such as verifying the presence of a cap or closure, measuring fill levels, detecting tablets as they are dispensed, ensuring label presence and accuracy, and capturing images of filled medications for drug verification. Learn more on page 12.



Medical Device Design

Banner has reliable solutions for companies in the medical device industry that use or test liquids such as water, alcohol, oil, blood, and biological material. Banner offers a variety of user-friendly solutions for precision level detection, liquid detection, air bubble and bolus detection, and indicator lights for operator guidance so our partners can focus on maintaining the highest standards of quality and patient care. Learn more on page 14.

Medical Manufacturing

Ensuring product quality in assembly processes for medical products or kitted assemblies is critical. Companies around the world rely on Banner Engineering to provide solutions that help ensure product quality and consistency; assembly processes and efficiency; and worker experience, productivity, and safety. Learn more on page 16.

Lab Automation

Well Plate Positioning

Challenge

High-throughput labs require robotic systems for automated processing of microplates used for clinical research and diagnostic testing. These plates must be positioned precisely and consistently to ensure that each plate is properly aligned for liquid-handling robots to dispense to or extract from tiny individual sample wells.

Solution

- The Banner Q4X laser distance sensor can detect and measure targets with sub-millimeter precision.
- The laser features high excess gain to reliably detect well plates regardless of color or surface inconsistencies, and it can verify the color of well plates, which is helpful for mixed-use lab environments.
- The visible laser light aids in installation, setup, and maintenance.

Q4X Laser Distance Sensors

Media Level Detection: Non-Water Based (Refraction)

Challenge

Reliable and accurate detection of non-water based media with small to micro volumes. Sensor size and position requirements often prevent detection at the point of interest.

Solution

- Refraction sensing method typically uses visible red light (635 nm) that relies on the media's refraction index to concentrate or redirect the light.
- Two-piece amplifier and fiber optic sensing head is ideal in a compact and flexible sensing system.
- Slim amplifiers contain cross-talk avoidance circuitry, dual displays (actual and set value) and setup through on-board switches, remote teach, or IO-Link.
- Fiber optic sensing heads are available in many standard configurations with custom options available.

DF-G3 Long Range Fiber Optic Amplifiers

Tight Bend Radius Fibers

Media Level Detection: Water Based

Challenge

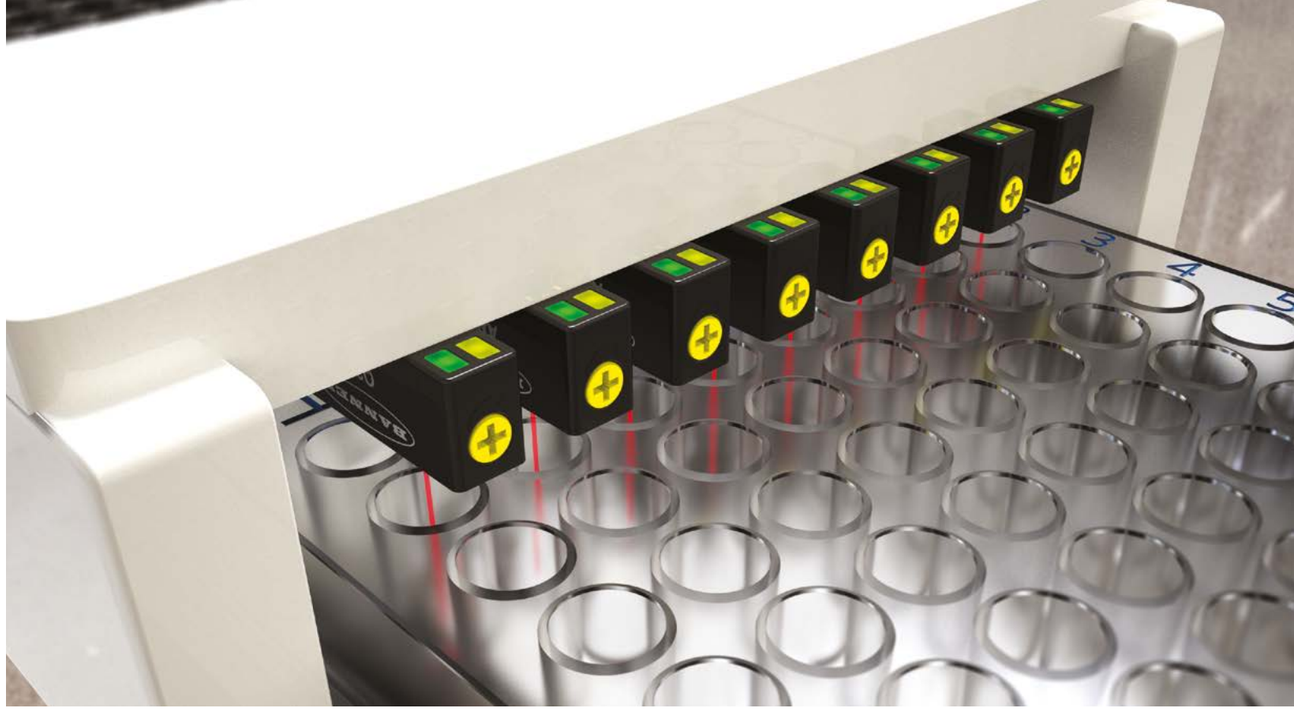
Reliable and accurate detection of water-based media with small to micro volumes. Sensor size often prevents detection at the point of interest.

Solution

- DF-G3 two-piece amplifier and fiber optic sensing head allows for smaller sensor size and high accuracy in a compact and flexible sensing system.
- Absorption sensing method uses a long infrared light source of 1450 nm that relies on the media's absorption index to reduce the transmission of light.
- Slim amplifiers contain cross-talk avoidance circuitry, dual displays (actual and set value), and setup through onboard switches, remote teach, or IO-Link.
- Fiber optic sensing heads are available in many standard configurations with custom options available.

DF-G3 Long Range Fiber Optic Amplifiers

Heavy-Duty Fibers



Well Plate Filling

Challenge

Automated well-plate-handling systems require both maintaining accuracy and managing material costs. Over- or under-dispensing media will have a negative impact, increasing these costs. If systems use multiple bulky sensors in close proximity to verify filling volumes, there is the potential for crosstalk, which reduces accuracy and requires multiple well-plate positions to complete a single detection cycle.

Solution

- Banner's compact Q2X sensors have a width of just 8 mm. This makes them fit easily into tight spaces for accurately measuring well volumes.
- A crosstalk-immunity algorithm allows Q2X sensors to be placed next to each other in machines, to verify a complete row of wells in one pass.
- The small, high-visibility Class 1 laser emitter is safe and accurate.

Q2X Compact Photoelectric Sensors

Bubble Detection in Tubing

Challenge

Air bubbles and boluses are common in many lab automation assays. Reliable and accurate detection is critical regardless of the medical tubing size or transparency. Sensor size can also be an issue when space is limited. Most bubble sensors are fixed to only work with one tubing size, requiring the life-cycle management of more sensor parts.

Solution

- Refraction sensing method uses visible red light (635 nm) to detect the change in media (bubble or bolus).
- Analog output available to measure various aspects of a bubble or bolus.
- Two-piece amplifier and fiber optic sensing head is ideal for a compact and flexible sensing system.
- Fiber optic sensing heads can be customized based on installation requirements.

DF-G3 Long Range Fiber Optic Amplifiers

Plastic Convergent Fibers

Lab Automation

Turbidity Measurement

Challenge

In a lab, it can be difficult to accurately determine the volume of cells and other particles suspended in a media base.

Solution

- By using visible red light (635 nm), particles absorb or scatter the light allowing a measurement of the particle level.
- Two-piece amplifier and fiber optic sensing head is ideal in a compact and flexible sensing system.
- Analog output amplifiers enable measurement of particle density.
- Fiber optic sensing heads are available in many standard configurations with custom options available.

DF-G3 Long Range Fiber Optic Amplifiers

Tight Bend Radius Fibers

Machine Status in Automated Clinical Laboratories

Challenge

The customer sought to integrate lights that would convey machine status for multiple levels of users while also complying with corporate color standards. Cell-level personnel needed to be instructed on the next process steps and line-level personnel needed to quickly identify cell states and conditions.

Solution

- K50 Pro indicators give point-of-use process guidance and executive feedback during cell operations with animations and audible tones.
- TL50 tower lights provide bright, easy-to-see status indication of statuses to management, fulfillment, and maintenance personnel.
- These lights can be programmed to conform to brand guidelines and customized with specific laser engraving.

K50 Pro Indicators

TL50 Tower Lights

Machine Illumination for Inspection and Testing Procedures

Challenge

Confined areas such as reagent and waste tank spaces require lighting for operators. However, traditional lights may be damaged by the corrosive chemicals used inside.

Solution

- The WLF15 provides bright LED illumination and features a compact, low-profile design, ideal for use in tight and confined areas.
- Rugged construction and a polycarbonate shell resists chemicals, shock, and vibration while remaining lightweight.
- Options for the light to automatically turn on when the door is opened.

WLS15 Series LED Strip Lights

S15WL for Smaller Space Lighting

Challenge

Lab equipment has many isolated spaces with poor lighting. Having a way to easily illuminate these spaces helps workers with setup, operation, and troubleshooting.

Solution

- S15WL task lights are ideal for the confined locations common in lab equipment with its miniature, space-saving design.
- Its highly visible body provides 360° visibility to identify and troubleshoot problems faster.
- Ensures reliable use in wet areas (up to IP68).

S15WL In-Line Work Light

Vial Traceability

Challenge

Precisely tracking and identifying test tubes, vials, and ampoules throughout the entire lab process flow is essential for prompt processing and patient safety. High sample volumes, manual handling, and workflow inefficiencies can lead to delayed or incorrect lab results.

Solution

- ABR 3000 Series imager-based barcode readers deliver superior decoding capabilities that provide fast and reliable tracking.
- The ultracompact housing allows installation into tight lab spaces, and choice of push-button setup or remote software interface allow easy setup and operation.

ABR3000 Imager-Based Barcode Readers

Track Vials Through an Automated Clinical Laboratory

Challenge

Pucks carrying filled vials through an automated laboratory require error-free tracking to prevent bottlenecks and errors. Incorrect testing or slow reporting of results can decrease satisfaction and quality of care. Additionally, many traditional sensors don't fit in the confined, crowded spaces found in laboratory settings.

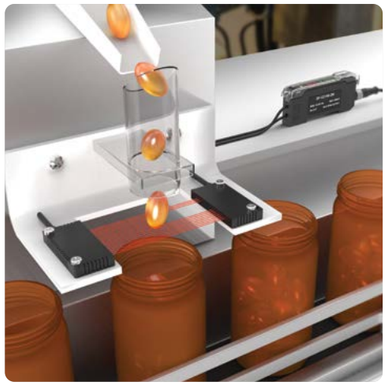
Solution

- One of the thinnest self-contained sensors (3.6 mm thin) in the industry, the VS2 Series ultra-thin miniature sensors' unique flat design brings precision sensing into tight areas.
- EZ-BEAM technology uses specially designed optics and electronics for reliable sensing without needing adjustments.

TCNM Laser Barcode Scanners

VS2 Ultra Thin Miniature Sensors

Pharmacy Automation



Pill Counting with Compensation

Challenge

Reliably detect a wide range of pharmaceuticals such as small, large, colored, translucent, and dusty pills.

Solution

- Two-piece amplifier and fiber optic array is ideal for reliable sensing in confined locations.
- Advanced auto-compensating algorithm adjusts for dust buildup.
- Health output will signal when dust is approaching a critical level.
- Fiber optic arrays are available in many standard configurations with custom options available.

DF-G2 High Speed Fiber Optic Amplifiers

PBRSL1X326U Fiber Array

Measuring Fill Level in Pill Hoppers

Challenge

Managing automated machines for filling pill bottles requires ensuring that hoppers consistently maintain an appropriate fill level. If the hopper is filled too high, product will not feed correctly. If the level is too low, the supply could run out and halt production. A method is needed to measure hopper fill level to reliably control the feed system.

Solution

- Banner's QS18 ultrasonic sensor is ideal for wide-angle coverage. Placed above a hopper, it detects the level of pills in the hopper to ensure a consistent average.
- The QS18 is immune to color changes or transparency, enabling versatile detection. Its tolerance to airborne dust ensures accurate detection of chalky, uncoated tablets.

QS18U Ultrasonic Sensors

Reduce Picking Errors with Multicolor Indication

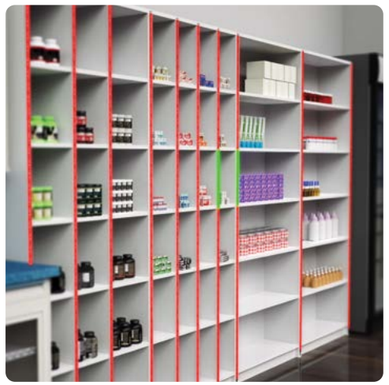
Challenge

Repetitive tasks such as pulling medications and usage sheets can be problematic without clear operator guidance. Indicator lights can be prohibitively costly for large will-call systems common in pharmacies and hospitals.

Solution

- Five standard lengths (from 300 to 2000 mm) can be cut in 50 mm increments to fit to exact application specifications.
- To identify which box the pharmacist should pull medications from, the corresponding WLF12 Pros would show green. This helped reduce errors when kitting for customer orders.
- With the LC25 LED Controller, the WLF12 offers 19 colors and 15 animation effects to visually communicate machine states to people working on or near equipment.

WLF12 Pro Flexible Strip Lights



Flexible Strip Light for Operator Guidance

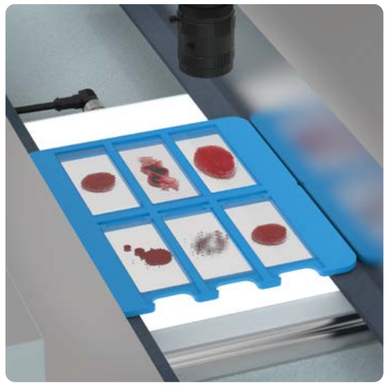
Challenge

In a fast-moving pharmacy, it can be difficult to direct pharmacists and support staff to patient prescriptions. Incorporating multicolor indication enhances productivity because it saves workers time identifying which cube to pick from.

Solution

- The WLF12 is a flexible strip light that offers 19 colors and 15 animation effects to visually communicate which section pharmacists should select the prescriptions from.
- Peel-and-stick installation using high-strength adhesive backing ensures quick and secure mounting.
- Five standard lengths (from 300 to 2000 mm) can be cut in 50 mm increments to fit to exact application specifications.

WLF12 Pro Flexible Strip Lights



Vision Inspection

Challenge

High humidity and media splattering can impact the use ordinary inspection lighting. Pharmacies require bright, uniform vision lighting for precise inspection and detection.

Solution

- The WLA-2's LED array illuminates larger areas than strip lights with an even pattern of light and no shadows.
- Waterproof, the WLA-2 is sealed and rated IP69K for high-temperature and washdown areas.
- Available in four sizes and three window types as standard with customized options.

WLA-2 LED Area Lights

High-Speed Barcode Inspection

Challenge

In the health and supplement industry, products must have the correct labels because they list important dosage information, warnings, and ingredients. Ensuring the correct label is on the correct product helps avoid product waste and safety issues.

Solution

- ABR series imager-based barcode readers can decode 1D and 2D symbols and are simple to operate, easily ensuring correct labels have been applied.
- Fast read rates, broad depth of field, and high resolution provide accurate high-speed barcode reading.

ABR Imager-Based Barcode Readers

QS18 Photoelectric Sensors

Medical Device Design

Precision Media Level Detection

Challenge

Laboratories that use or test liquids (such as water, alcohol, oil, blood, or biological material) require a method to reliably monitor the volume of this media, without additional components such as reflectors or emitters. The color of certain liquid media also presents some difficulties, as some darker colors can absorb light from red sensor beams.

Solution

- VS8 blue light sensors provide color contrast to detect troublesome media.
- With a fixed-field beam, the VS8 blue light is a self-contained sensor, without the need for a separate emitter or reflector.
- Its miniature size fits into most medical machines built for liquid analysis.
- The VS8's high switching frequency is perfect for high-throughput applications.
- Remote teaching provides reliable and precise detection.

VS8 Miniature Sensors

Precision Media Level Detection

Challenge

Detecting tank levels of media and waste that contain a wide range of chemical compositions.

Solution

- Sensing probe is encased in a chemical-resistant sheathing and works on light refraction principle.
- Two-piece amplifier and fiber design allows electronics to be remotely located.
- Advanced auto-compensating algorithm adjusts for environmental conditions.
- Health output will signal when environmental conditions approach a critical level.
- Fiber optic probes are available in custom configurations.

PBE4 Fiber Dip Stick

Small Indicator Application

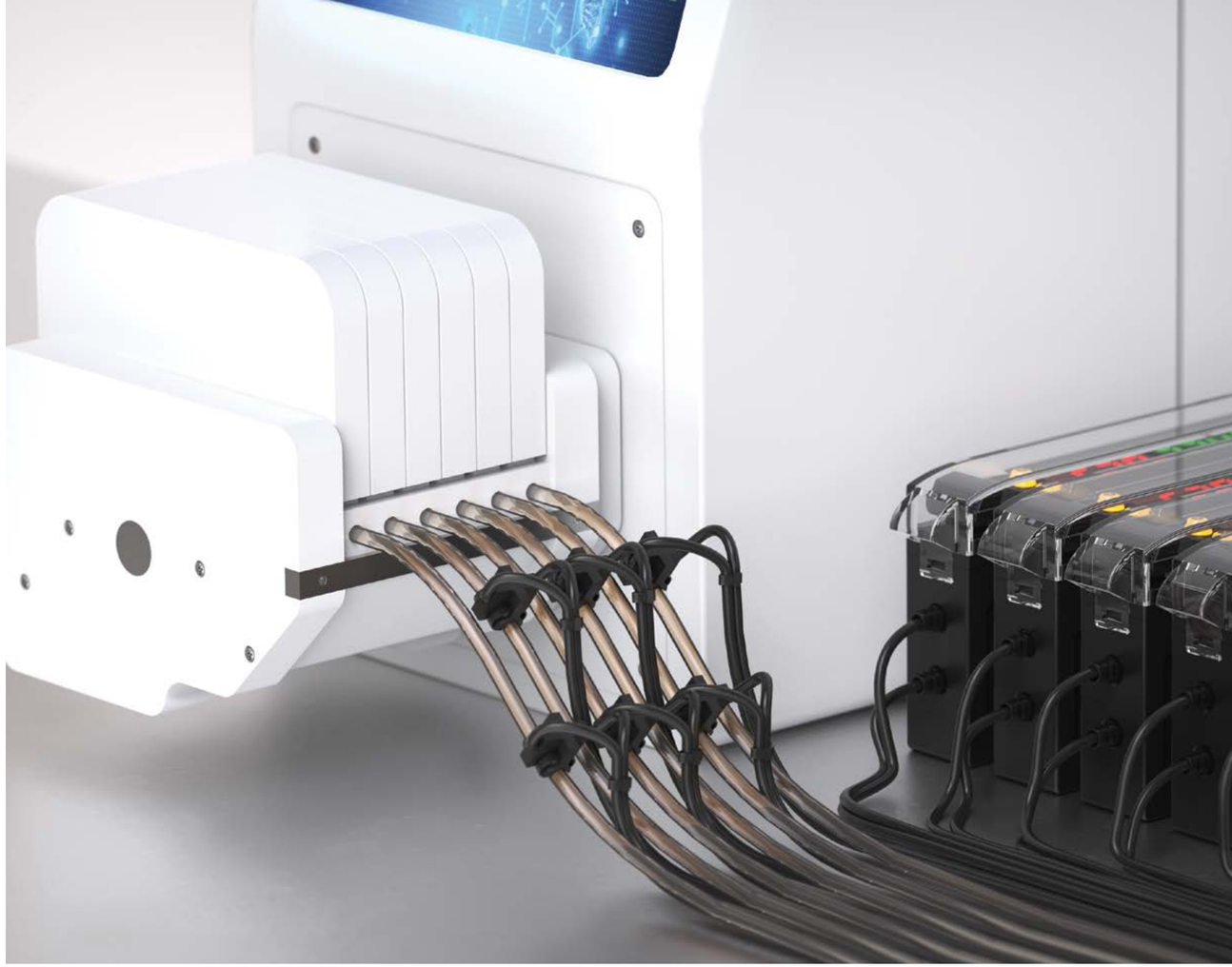
Challenge

Complex machines require panels capable of supporting multiple functions. A reliable source of quality indicators is needed for communicating information while maintaining corporate color identity.

Solution

- The S22 Pro Indicator has standard and custom display options for users to select unique colors and animations, making it easier to initiative processes, operate equipment, and identify errors.
- Communicate status conditions and guide operators through machine processes.

S22 Panel Indicator



Air Bubble and Bolus Detection

Challenge

Air bubbles and boluses in various sizes of medical tubing can cause incorrect IV therapy or drug infusion delivery. Accurate and reliable detection of air bubbles and boluses is essential for patient safety.

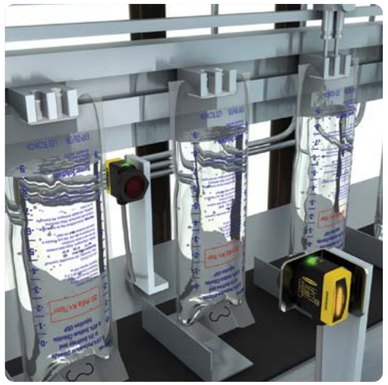
Solution

- Fiber optics are compact and have different head shapes available, allowing them to fit into confined areas and accommodate a range of tubing sizes.
- DF-G3 amplifier sets up quickly and operates easily with a simple user interface and dual digital displays.

DF-G3 Long Range Fiber Optic Amplifiers

Plastic Convergent Fibers

Medical Manufacturing



Detection of Clear Liquids in Transparent Packaging

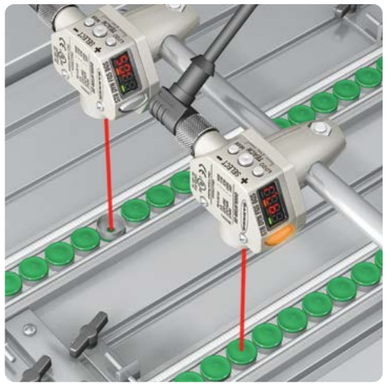
Challenge

It can be difficult to detect clear liquids inside transparent IV bags, glass vials, and plastic syringes. Standard photoelectric sensors operate in the visible red wavelength from 620 to 685 nm, but light does not attenuate well in water in this range.

Solution

- The Banner QS30H2O high-power water sensor uses a 1450 nm wavelength LED, which can effectively and accurately detect water and other clear liquids.
- Low-gain models are recommended for fully transparent containers such as clear glass test tubes. Higher-gain models are available to detect liquids in colored translucent plastic or even opaque containers.

QS30H2O Sensors



Cap Sorter Detection

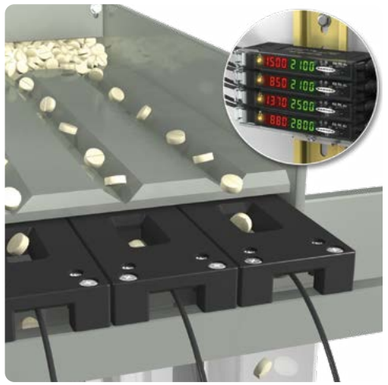
Challenge

Detecting the presence of bottle caps and ensuring that there is unbroken movement is a crucial step in the bottle filling line. Any delay or missing caps may indicate a jam along the production line, and these errors can cause extreme backups and downtime.

Solution

- Banner Q4X laser distance sensors have high excess gain to accurately detect the presence of caps regardless of their color or size.
- Features five user-selectable response speeds from 50 to 1.5 ms, for quick and uninterrupted readings.
- The sensor's IP69K-rated stainless-steel housing is resistant to chemicals.

Q4X Laser Distance Sensors



High-Speed Tablet Counting

Challenge

In pharmaceutical packaging, products such as tablets, capsules and gel caps need to be accurately counted to achieve the proper number of tablets in each bottle.

Solution

- The DF-G2 amplifier has a fast response speed and can detect extremely small sizes, such as 3 mm tablets or pills.
- When filling bottles, falling tablets trigger the DF-G2 fiber amplifier, which keeps count of the tablets.
- Offers various expert-style teaching and manual adjustment sensitivity via rocker switch.

DF-G2 High Speed Fiber Optic Amplifiers

Detecting Clear Glass and Plastic PET Bottles in Washdown Environments

Challenge

In a day, a single bottling line may process bottles in a variety of shapes, sizes, materials, colors, and translucencies. These changes can complicate accurate detection, unless installed sensors can reliably detect varying targets. In addition, bottling operations are typically washdown environments, so sensors must be able to resist heavy spray from water and cleaning chemicals.

Solution

- The Q4X dual-mode sensor measures distance and light intensity to reliably detect a wide range of transparent and translucent objects.
- IP69K-rated stainless steel housing resists exposure to harsh cleaners and washdown.

Q4X Laser Distance Sensors

Transparent Glass Bottle, Vial, or Plate Detection

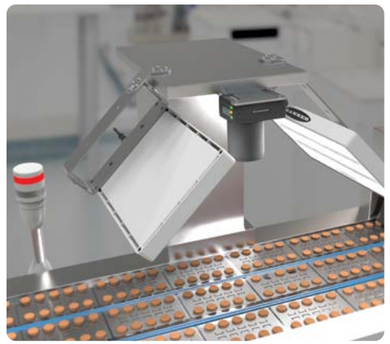
Challenge

High-speed applications, such as clear bottle or vial detection, require reliable position detection. Clear bottles present a detection challenge because many sensors will see through a clear object instead of recognizing its presence.

Solution

- QS18 Series clear object photoelectric sensors quickly and reliably detect clear and transparent objects.
- Its coaxial optical design results in higher positional accuracy and precise leading edge detection.
- A cover can shield the sensor for easy cleaning in washdown environments, and the beam only needs a small opening in the cover to reliably detect clear objects.

QS18 Clear Object Photoelectric Sensors



Inspecting Blister Packs for Tablet Placement, Position, and Shape

Challenge

Inspecting the variety of pharmaceutical pill shapes, sizes, and colors has become a significant challenge. Each tray must be inspected to verify that the correct pills have been properly placed and that there are no chipped or broken pills.

Solution

- An LED-dense array with high output that illuminates a large area with an even pattern of light and no shadows.
- The WLA-2 is sealed and rated IP69K for high-temperature and washdown protection.
- Lensed models are available for intense, close-range inspection.

WLA-2 LED Area Light

Blemish Detection on Bandages

Challenge

Pharmaceutical products, such as bandages, produced in mass quantities require thorough inspection before being packaged. Extremely important quality checks ensure every material meets certain standards. Recognizing blemishes on a pharmaceutical product allows the manufacturing process to be stopped and examined by operators so they can fix the problem and prevent additional waste.

Solution

- iVu Series vision sensors combine a camera, controller, lens, and light all in one device.
- Each sensor contains area, match, sort, and blemish sensors so the iVu can inspect bandage material for flaws and reject sections of material where blemishes are too large or numerous.

iVu Series Vision Sensors

More Sensors, More Solutions.

Banner Engineering designs and manufactures industrial automation products including sensors, smart IIoT and industrial wireless technologies, LED lights and indicators, measurement devices, machine safety equipment, as well as barcode scanners and machine vision. These solutions help make many of the things we use every day, from food and medicine to cars and electronics. A high-quality, reliable Banner product is installed somewhere around the world every two seconds. Headquartered in Minneapolis since 1966, Banner is an industry leader with more than 10,000 products, operations on five continents, and a world-wide team of more than 5,500 employees and partners. Our dedication to innovation and personable service makes Banner a trusted source of smart automation technologies to customers around the globe.

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