# Packaging Solutions

BANNER®

more sensors, more solutions

# Contents

# Industry 4.0

## What IIoT Means for Manufacturing

IIoT is perhaps the biggest buzzword in factory automation today, and it is a key aspect of Industry 4.0. IIoT already impacts the way factories operate today, and it will increasingly impact businesses in the future.

## Industry 4.0, IoT, and IIoT

**Industry 4.0** describes the current wave of technological innovation as an era in history characterized by interconnectivity enabled by the internet and wirelessly-connected devices. While digital technologies enable the collection of large amounts of valuable data, this data primarily exists in silos that are not easily accessible for analysis and actionable insights.

The technologies of Industry 4.0 make data readily available and automate the communication between industrial automation equipment and systems. This enables predictive analysis for machines as well as process optimization across the factory floor.

The **Internet of Things (IoT)** describes the technologies that connect objects—from consumer electronics to industrial components—to the internet. The **Industrial Internet of Things** (or IIoT) refers specifically to the impact of this innovation on industrial applications.

The key benefits of IIoT technologies for factory automation include:

- Visibility and Remote Access to the operational status of machine components (both historically and in real-time)
- Predictive Analytics for more accurate planning of machine maintenance
- Interconnectivity for seamless communication among machines, components, and people

## What Does IIoT Mean For Factories?

Following are three practical examples of how visibility, predictive analytics, and interconnectivity are impacting factories today.

### Visibility and Remote Access Increase Efficiency

In order to ensure efficient processes throughout the factory, machine operators must quickly and easily determine the status of machines. The greater the visibility, the easier it is to identify and resolve problems and keep operations running smoothly.

Traditional tower lights provide visibility wherever they can be physically seen. However, tower lights equipped with wireless communication capabilities both display a visual indication of an event and transmit wireless alerts. This helps ensure that operational problems are identified and addressed immediately, regardless of whether a machine operator is physically present to see the visual indicator.

An additional benefit of wireless indicators is data logging for use in OEE (Overall Equipment Effectiveness) calculations. Not only can operators respond to alerts quickly as they occur, but a history of alerts can also be stored and analyzed offline. This historical data can be used to track machine uptime, production volume, rejected parts, and other key metrics to make more informed decisions over time.

### Predictive Maintenance Increases Machine Uptime and Availability

In addition to real-time status monitoring, IIoT technologies can also be used to help avoid machine failures thanks to predictive maintenance.

By monitoring machine components in real-time for increases in vibration and temperature, problems can be detected and resolved before they become too severe and cause additional damage or result in unplanned downtime. Over time, the historical data creates a valuable machine performance log that can be used to make more informed maintenance decisions down the line.

### Interconnectivity Streamlines Factory Communications

Wireless technologies also enable seamless interaction among human workers, and can have a significant impact on the efficiency of manual production lines. For example, instead of requiring machine operators to walk over to the manager area for assistance with a technical issue, a wireless system utilizing connected pushbuttons or switches and tower lights can be used to alert managers when assistance is needed on the line.

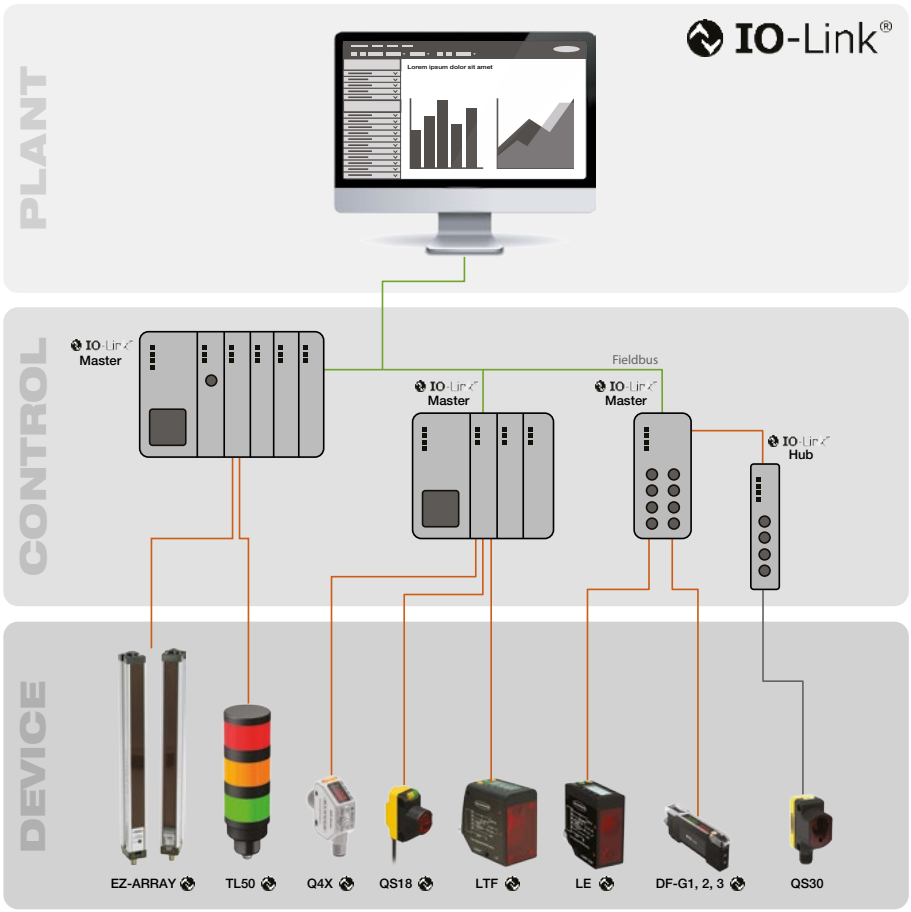
## Is Your Business IIoT-Ready?

From keeping machines running smoothly to enabling seamless communication among machines, components, and people, the benefits of IIoT technologies are tangible. However, it can be challenging knowing where to start and how to use these technologies to their fullest advantage.

Below are three questions to help manufacturers prepare for a move from digital to IIoT:

- What are the inefficiencies in your operations?
- What kind of data would help you overcome these inefficiencies?
- What communication processes need to be in place in order to utilize data in a meaningful way?

Answering these questions can help manufacturing facilities identify the best technologies to meet their immediate business needs and start taking advantage of the long-term benefits of IIoT.




## What is IO-Link?

IO-Link (IEC61131-9) is an open standard serial communication protocol that allows for the bi-directional exchange of data from sensors and devices that support IO-Link and are connected to a master. The IO-Link master can transmit this data over various networks, fieldbuses, or backplane buses, making the data accessible for immediate action or long-term analysis via an industrial information system (PLC, HMI, etc.). Each IO-Link sensor has an IODD (IO Device Description) file that describes the device and its IO-Link capabilities.

## 5 Advantages of IO-Link

1. Standardized and Reduced Wiring

   IO-Link devices do not require any special or complicated wiring, but can be connected using the same cost-effective standard unshielded 3-wire cables as conventional discrete I/O. In addition, IO-Link also eliminates the need for analog sensors and reduces the variety of cord sets required for sensors, which saves inventory costs. IO-Link also supports a master-slave configuration with passive connection points, which further reduces wiring requirements.

2. Increased Data Availability

   Access to sensor-level data helps ensure the smooth operation of system components, streamlines device replacement, and enables optimized machine maintenance schedules—all of which save costs and reduce the risk of machine downtime.

   This wealth of valuable data made available through IO-Link is integral for the Industrial Internet of Things (IIoT) and Industry 4.0 initiatives.

3. Remote Configuration and Monitoring

   With IO-Link, users can read and change device parameters through the control system software, enabling fast configuration and commissioning that saves time and resources. In addition, IO-Link allows operators to dynamically change the sensor parameters from the control system as needed—such as in the case of product changeover—which reduces downtime and allows machines to accommodate greater product diversity.

   In addition, the ability to monitor sensor outputs, receive real-time status alerts, and adjust settings from virtually anywhere allows users to identify and resolve problems that arise on the sensor level in a timely manner. This capability reduces costly downtime and improves overall efficiencies.

4. Simple Device Replacement

   In addition to the ability to remotely adjust sensor settings, IO-Link's data storage capability also allows for automated parameter reassignment in case of device replacement (also known as Auto-Device Replacement or ADR). Users can import existing sensor parameter values into a replacement sensor for seamless replacement, getting the new device up and running as quickly as possible.

5. Extended Diagnostics

   IO-Link provides users with visibility into errors and health status from each device. This means that users can see not only what the sensor is doing but also how well it is performing—a valuable insight into a machine's efficiency. In addition, extended diagnostics allow users to easily identify when a sensor is malfunctioning and diagnose the problem without shutting down the line or machine.

   The combination of real-time and historic data not only reduces troubleshooting efforts as issues arise but also allows for optimization of machine maintenance schedules, saving costs and increasing efficiency in the long term

# Industry Challenges

- Unplanned Downtime
- Wash Down Enviornment
- Frequent Product Changeover
- Machine Troubleshooting
- Detecting Challenging Packaging material
- Safeguarding Complex machines
- Predictive Maintenance
- Data and Analytics
- Food Safety Regulations
- Track and Trace

## Banner Engineering is Developing Products to meet these Challenges:

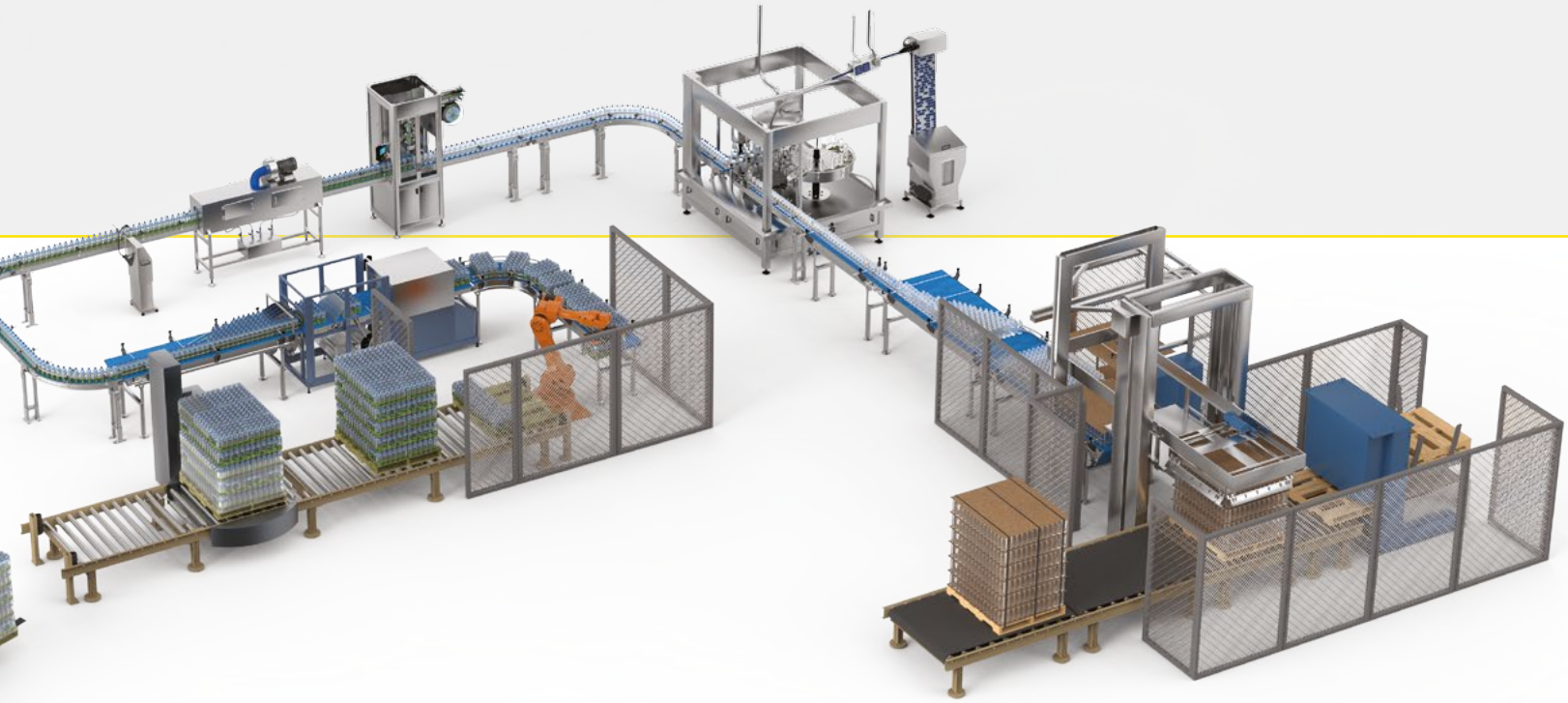
IO-Link®

**IO-Link Communication**

IO-Link is an open standard serial communication protocol that allows for the bi-directional exchange of data from sensors and devices that support IO-Link and are connected to a master. The IO-Link master can transmit this data over various networks, fieldbuses, or backplane buses, making the data accessible for immediate action or long-term analysis via an industrial information system (PLC, HMI, etc). Banner IO-Link products reduce wiring, increase data availability, enable remote configuration and monitoring, simplify device replacement, and provide extended diagnostics.

**Safety Products that meet Cat 4 PLe**

Protecting employees at your work place is a high priority and that is why Banner designs our safety components to the highest safety ratings in the market.



### Ecolab Certified

Many manufactures use a mixture of cleaning chemicals to prevent the growth of bacteria on their equipment. Banner takes this into consideration when selecting housing and window materials for our products for food and beverage industries. Ecolab Certification means the Banner product is robust when exposed to cleaning chemicals and will hold up well to regular cleaning.

### FDA Compliant Materials

In the manufacturing process it is possible for food or beverages to come in contact with components on the line during the processing, packaging, or storage process. Banner understands this concern and is developing products with housings made of FDA compliant materials.

### IP69K Products

There is an increasing need in the market to develop sensors that can hold up to washdown areas and therefore Banner is developing more sensors that meet and exceed the IP69K test requirements. The IP69K rating refers to the product's ability to resist ingress of dust as well as high temperature high pressure water.

### Hygienic Design

Food safety is a high priority for manufacturers today. When developing new products for the food and beverage industry, Banner takes into consideration the shape of the sensor housing. It is important for the housing shape to be self-draining to remove residues of products and chemicals during the cleaning process. The housing should also be smooth and free from crevices, sharp corners, protrusions, and shadow zones.

# Packaging in the Food Industry

The food industry is the largest industry on the planet. As economies around the world continue to evolve and develop, so do the lifestyles and demands of consumers. In this highly competitive market, a company's ability to respond and adapt to these changes is critical. Changing consumer demands quickly translates to changes in products, production processes and packaging.

Banner has developed products specifically designed for the food industry. Our industry knowledge and expertise in sensors and vision sensors, LED lights and indicators, wireless networks and safety control allow us to offer solutions that address these challenges. Products and solutions from Banner help food manufacturers around the world reduce expenses, improve quality and efficiency, and increase product output and profits without compromising worker safety.

# Solutions for Packaging in the Food Industry

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## Clear Tray Detection for Fill Trigger

**Challenge**

- Reliably sense transparent containers
- Suitable for harsh washdown environments

**Featured Solution**

Q4X

**Other Solutions**

QM26 Clear Object Detection
QS18 Clear Object Detection

**Key Features**

- Algorithm uses distance and intensity for clear object detection
- FDA grade stainless steel and Ecolab certified
- IP69K
- No reflector required

**Key Benefits**

- Reliably detects transparent containers no matter what shape or surface
- Holds up to chemicals used to clean equipment which reduces downtime
- Holds up to temperature cycling which occurs in high temperature and high pressure washdown
- Quick installation and the reflector is not a concern for maintenance

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## Roll Diameter

**Challenge**

- Accurately measure roll diameter
- Targets often contain vibrant, multi-colored, graphics of varying reflectivity

**Featured Solution**

LE250

**Other Solutions**

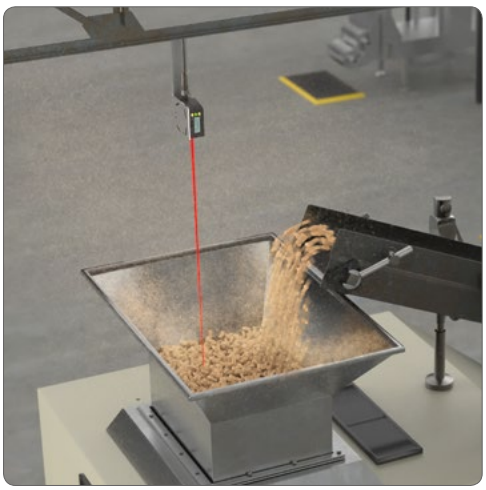
LE550
LTF
Q4X

**Key Features**

- Sub-millimeter repeatability regardless of color, reflectivity, or angle
- Factory calibrated for full scale measurement out of box
- Two-line, eight-character display

**Key Benefits**

- Stable measurement minimizes waste left on core
- Easily deployable without need to teach specific range or empty core
- Visual feedback for easy adjustment and troubleshooting



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## Hopper Fill Level Monitoring

**Challenge**

- Variable target size, texture, color and reflectivity
- Measuring hopper fill level while avoiding false readings from side walls

**Featured Solution**

LTF

**Other Sslutions**

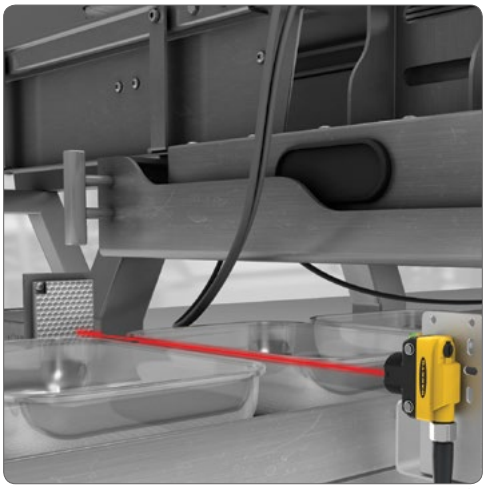
LE550
QT50U

**Key Features**

- Best in class linearity, repeatability and resolution
- Visible red laser spot
- Two-line, eight-character display
- 12 m and 24 m range

**Key Benefits**

- Accurate readings regardless of color, texture, or angle of target
- Laser spot allows for easy alignment
- Visual feedback for quick adjustment and troubleshooting
- Long range allows sensor to be out of the way of operators or for washdown



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## Clear Object Detection

**Challenge**

- Sense leading edge of clear PET trays and clamshell packaging
- Food powder on reflector creates false outputs
- Complicated sensor set up

**Key Features**

- Polarized coaxial optical design
- 400 µs ON/OFF response time
- ClearTracking Algorithm
- Single push teach method

**Featured Solution**

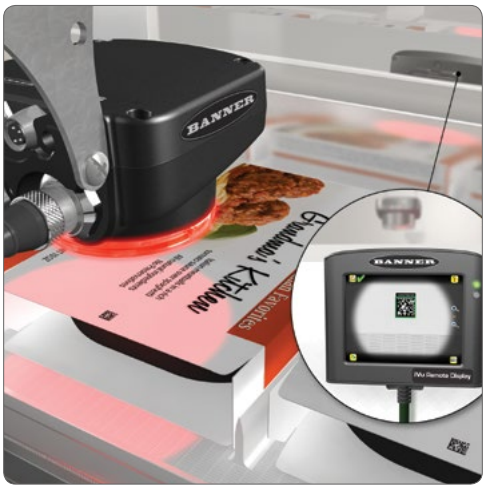
QS18 Clear Object Detection

**Other Solutions**

Q4X

**Key Benefits**

- Reliably detects clear and mirror-like surfaces
- Precise leading-edge detection
- Ability to compensate for dust build-up and ensure consistent detection
- Single push teach method makes for quick and easy installation

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## Carton Verification

**Challenge**

- Ensuring the product is correctly placed in the appropriate carton
- Changeover between different products can increase downtime
- Need easy-to-use solution

**Key Features**

- Reads a variety of linear and 2D barcodes
- Ethernet communications
- Up to 30 stored inspections
- Configured via touchscreen

**Featured Solution**

iVu GEN II BCR

**Other Solutions**

*Presence*Plus BCR

**Key Benefits**

- Robust barcode decoding
- Barcode data can be stored in PLC or set for simple pass fail
- Reduce downtime with saved inspections for different products
- No complex software minimizes necessary training for setup

see page 65

## Cabinet Lighting

**Challenge**

- Limited space inside panel
- Dark control panel makes it difficult to troubleshoot problems

**Key Features**

- 15 mm profile
- Completely sealed with an IP67 rating for use in wet or dusty environments

**Featured Solution**

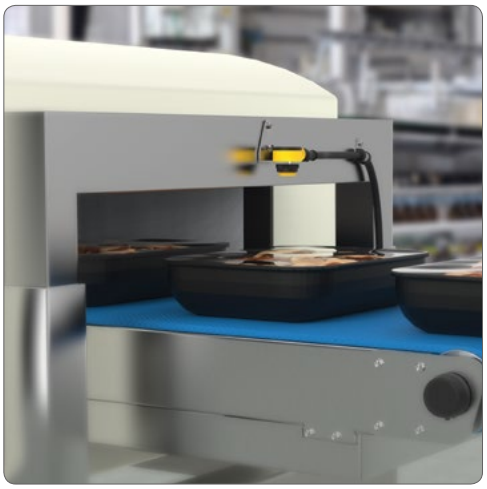
WLS15

**Other Solutions**

WLB32

**Key Benefits**

- Low profile fits in tight spaces
- Will hold up and last a long time in tough environments



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## Sensors for Wash Down Areas

**Challenge**
- High pressure high temperature washdown
- Harsh cleaning agents degrade housing
- Thermal cycling causes condensation

**Featured Solution**
T18-2

**Other Solutions**
Q4X

**Key Features**
- IP69K-rated
- Ecolab certified
- Ultrasonically welded joints
- Epoxy encapsulated

**Key Benefits**
- Tested to withstand 1200 PSI and 180 °F washdown
- Chemically compatible with washdown chemicals
- Ultrasonically welded joints create one piece housing
- Epoxy-filled housing reduces potential for condensation

see page 66

## Machine Illumination—Washdown

**Challenge**
- Machine illumination in close contact with food
- Wash down area
- Food contamination hazards

**Featured Solution**
WLS27

**Other Solutions**
WLS15

**Key Features**
- Brilliant LED illumination in hygienic cylindrical design
- Rugged ultrasonically welded, IP69K construction and Ecolab certified
- Shatterproof copolyester housing

**Key Benefits**
- 50,000 hours lifetime, easy-to-clean light
- Specifically designed to withstand food and beverage industry applications
- No secondary enclosure needed to protect against broken lights

see page 77

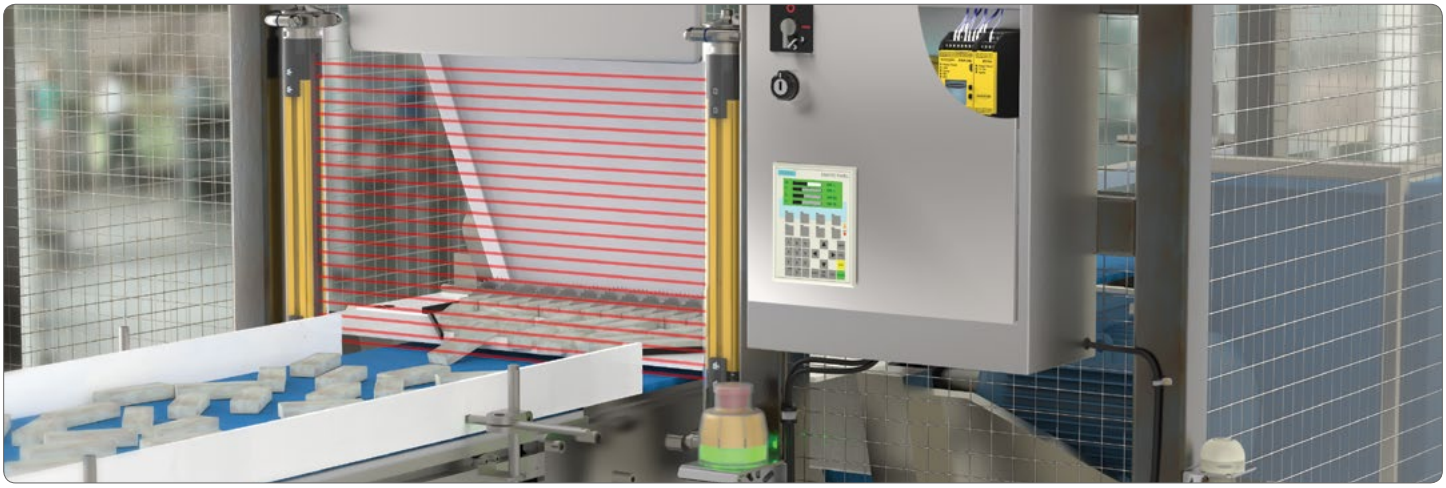
## Wash Down Touch Buttons

**Challenge**
- Control panel located in washdown area
- Workers use thick rubber gloves
- Food area

**Featured Solution**
S22 Touch

**Key Features**
- Rugged IP69K construction
- Smart electric field sensing technology
- FDA-grade models available

**Key Benefits**
- Built for high-pressure washdown environments
- Easily actuated with bare hands or work gloves
- FDA-grade models for use in food environments



## Safety Light Curtain—Wash Down Area

see page 56

**Challenge**

- Safeguard food processing machine
- Wash down area with harsh chemicals
- Temperature cycling

**Key Features**

- End-to-end zone protection with no dip switches
- IP69K enclosure with 316L stainless steel end caps
- Hydrophobically vented

**Featured Solution**

EZ-SCREEN LS (IP69K)

**Key Benefits**

- Intuitive, easy-to-use
- Build to withstand high pressure, high temperature washdown
- Air vents with vapor barriers prevent condensation during thermal cycling

## E-Stop Safety—Wash Down Area

see page 58

**Challenge**

- Holding up to a harsh environment
- Ability to identify which E-Stop was pressed
- Assembling components is time consuming

**Key Features**

- IP69K rated FDA Grade Silicon cover
- Ecolab certified
- Preassembled for fast installation
- Green/Red lighted base
- 8-pin Quick-Disconnect

**Featured Solution**

30 mm Mount E-Stop (IP69K)

**Key Benefits**

- Withstands high pressure and high temperature washdown
- Certified to withstand cleaning chemicals used in the food processing industry
- 360° visible indication of E-Stop actuation
- Easy installation with no assembly or wiring required

## Safety Monitoring

see page 60

**Challenge**

- Safeguard machine with varying safety add-ons depending on customer needs
- Complex logic or multiple safety scenarios
- Communicate with HMI to display machine status

**Key Features**

- Free, easy-to-use software using drag and drop function blocks
- Simulation mode
- Expandable I/O modules
- Industrial Ethernet communications and Profinet communications

**Featured Solution**

XS26-2

**Other Solutions**

SC26-2

**Key Benefits**

- Configure safety program in minutes
- Test configuration without need to wire or even own safety controller
- Base controller with 26 inputs and two dual-channel safety outputs can be expanded to fit machine requirements
- Ethernet-enabled models allows for easy communications with PLC or HMI

# Packaging in the Beverage Industry

Beverage production offers some of the biggest challenges in factory automation.

From severe conditions and harsh cleaning processes that can quickly degrade system components to safeguarding palletizers, conveyors, and other equipment that pose a safety hazard to personnel, each challenge works against total Overall Equipment Effectiveness (OEE) and the overall profitability of an organization.

Banner understands these challenges. Our industry knowledge, expertise in sensors, safety control, LED lights and indicators is combined the most comprehensive product catalogs in the industry. We are able to provide products and solutions that solve the unique challenges faced by beverage producers, helping them ensure and improve product quality, productivity, and safety, and achieve maximum Overall Equipment Effectiveness.

# Solutions for Packaging in the Beverage Industry

see page 43

## Line Pressure Control

**Challenge**

- Sensing bottle stoppage and shortage often requires two sensors
- On and Off-delay logic to ignore passing bottles requires additional PLC programming
- Bottles can be clear to opaque and filled or empty

**Featured Solution**

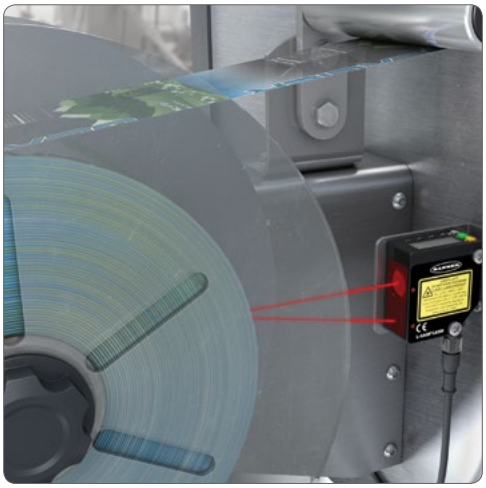
Q4X Dual Discrete

**Key Features**

- Dual discrete output
- Programmable output logic
- Dual mode/Clear Object Detection mode

**Key Benefits**

- One sensor solution instead of two
- On and off-delays within sensor reduce PLC programming
- Robust clear object sensing using distance and intensity changes



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## Roll Diameter

**Challenge**

- Flexible packaging often contains vibrant, multi-colored graphics of varying reflectivity that can be difficult to reliably sense
- Variable roll stock diameter increases changeover time when sensors need to be adjusted

**Featured Solution**

LE250/550

**Other Solutions**

Q4X

LTF

**Key Features**

- Laser triangulation with linear array technology
- Ready to measure full scale out of box or can be programmed with integrated LCD display

**Key Benefits**

- Ensures repeatability and accuracy for challenging targets regardless of color, reflectivity, or angle
- Reduces downtime between product changeover


see page 44

## Shrink Sleeve Labelling At High Speeds

**Challenge**

- High speed shrink sleeve applicator can run 800 bottles per minute
- Precise leading-edge sensing to center sleeve on bottle

**Featured Solution**

QS18LLP

**Other Solutions**

DF-G2

QS18 Clear Object Detection

**Key Features**

- 700 µs response time
- Laser-based retroreflective sensor

**Key Benefits**

- Fast response time to easily keep up with bottling line
- Narrow laser beam ensures repeatable leading-edge sensing

see page 45

## Clear Bottle Tipped

**Challenge**

- Detect downed bottles to prevent jams on filling line
- Bottles can be plastic, glass, clear or opaque

**Key Features**

- Single-point teach mode
- Coaxial polarized optics

**Featured Solution**

QS18 Clear Object Detection

**Other Solutions**

Q4X

**Key Benefits**

- Easy teach process minimizes install time
- Coaxial optics ensure reliable sensing regardless of material or opacity

see page 46

## Level Fill

**Challenge**

- Sense liquid in bottles of various colors from clear to opaque
- Sense under-filled clear or opaque bottles

**Key Features**

- 1450 nm wavelength detects water-based liquids inside translucent or opaque plastic and glass bottles
- Use of apertures to decrease the minimum detectable change in liquid level

**Featured Solution**

QS30H2O

**Other Solutions**

DF-G3LIR

**Key Benefits**

- See through bottles and detect water-based liquids
- Under-filled bottles can be removed from bottling line


see page 64

## Data Code Presence

**Challenge**

- Laser etched date code changes regularly
- Product changeover requires parameter changes without connecting to a PC

**Featured Solution**

iVu Plus BCR Gen2

**Other Solutions**

VE

*P4* Omni

**Key Features**

- Easy-to-use toolset
- Integral and remote screen for configuration and troubleshooting
- Save and store 30 inspections

**Key Benefits**

- Quickly create barcode inspection
- No computer software needed for setup
- Save inspections for quick product changeover


see page 42

## Registration Mark on Shrink Sleeve Label

**Challenge**

- Repeatable sensing of registration mark
- Registration mark colors vary depending on product
- Shiny, high-gloss labels

**Featured Solution**

R58E

**Other Solutions**

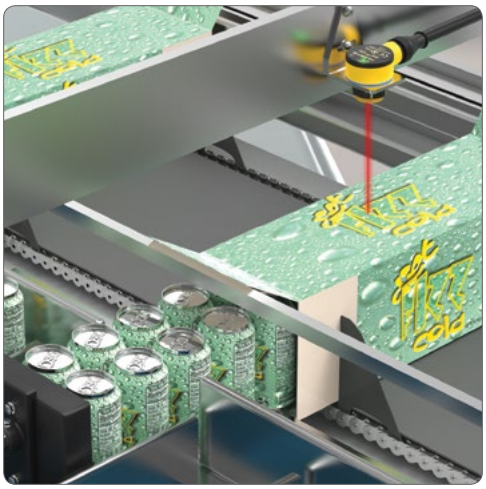
R55F

**Key Features**

- 50 µs response time
- RGB LED
- Smart gain-control algorithm

**Key Benefits**

- Quick response time ensures repeatable sleeve length
- RGB LED optimizes contrast
- Smart gain-control maximizes performance on low-contrast or high-gloss applications



see page 47

## Sensors for Wash Down Areas

**Challenge**

- Case packers are subject to washdown procedures
- Cases are often multicolored and have a glossy finish

**Key Features**

- IP69K, FDA-grade materials
- Ultrasonically welded housing and epoxy encapsulated cavities
- High excess gain

**Featured Solution**

T18-2

**Other Solutions**

M18-4

**Key Benefits**

- Built to withstand high-pressure, high-temperature washdown
- One-piece construction eliminates adhesives and effectively seals out moisture
- Minimal color sensitivity prevents chattering output on difficult targets

see page 66

## Machine Illumination—Washdown

**Challenge**

- Enclosed area is dark, making it hard for operators to see potential problems
- Filler machine is subject to washdown procedures
- Secondary lighting enclosure to protect against broken pieces

**Key Features**

- Bright LED illumination rated for 50k hours
- Hygienic, IP69K, Ecolab certified housing
- Shatterproof copolyester shell

**Featured Solution**

WLS27

**Other Solutions**

WLS28-2

**Key Benefits**

- Long lasting LED lights require minimal maintenaince
- Rugged design stands up to demanding washdown procedures
- Shatterproof housing can be installed directly inside the machine without worry

see page 77

## Wash Down Touch Buttons

**Challenge**

- Control panel located in washdown area
- Workers use thick rubber gloves
- Food area

**Key Features**

- Rugged, fully encapsulated IP69K construction
- Smart electric field sensing
- FDA-grade models available

**Featured Solution**

S22 Touch

**Key Benefits**

- Built for high-pressure washdown environments
- Easily actuated with bare hands or work gloves
- FDA-grade models for use in food environments

see page 65

## Cabinet Lighting

**Challenge**

- Limited space inside panel
- Dark control panel makes it difficult to troubleshoot problems

**Featured Solution**

WLS15

**Other Solutions**

WLB32

**Key Features**

- 15 mm profile
- Completely sealed with an IP67 rating for use in wet or dusty environments

**Key Benefits**

- Low profile fits in tight spaces
- Will hold up and last a long time in tough environments

see page 72

## Machine Indication

**Challenge**

- Ability to easily see indicator status from all angles in high ambient light conditions
- Machines use combination of AC and DC power sources
- Installation/Assembly time

**Featured Solution**

TL50

**Other Solutions**

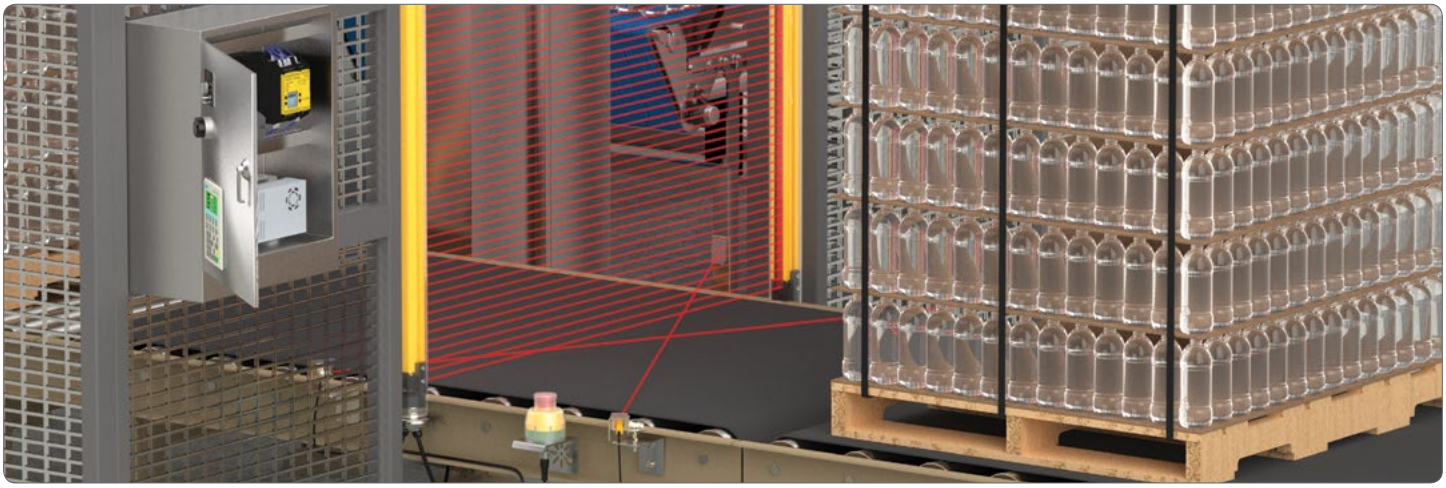
TL70

**Key Features**

- Constructed with white windows with high intensity LED's
- AC and DC power options available
- Audible options
- Preassembled models

**Key Benefits**

- High visibility of on and off states
- Flexibility to work with machines regardless of power supply
- Fast installation as no assembly is required



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- Configure safety program in minutes
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- Base controller with 26 inputs and two dual-channel safety outputs can be expanded to fit machine requirements
- Ethernet-enabled models allow for easy communications with PLC or HMI

## Safety Light Curtain—Wash Down Area

see page 56

**Challenge**

- Safeguard beverage palletizer
- Wash down area with harsh chemicals
- Temperature cycling

**Key Features**

- End-to-end zone protection with no dip switches
- IP69K enclosure with 316L stainless steel end caps
- Air vent with vapor barrier

**Featured Solution**

EZ SCREEN LS (IP69K)

**Key Benefits**

- Intuitive, easy-to-use safety light curtains
- Built to withstand high pressure high temperature washdown
- Air vents with vapor barriers prevent condensation during thermal cycling

## E-Stop Safety—Wash Down Area

see page 58

**Challenge**

- Harsh environment with high pressure washdown
- Difficult to tell what E-Stop is pressed when wired in series
- Modular systems are time consuming to install

**Key Features**

- IP69K rated FDA Grade Silicon cover
- Ecolab certified
- Green/Red lighted base
- 8-pin Quick-Disconnect

**Featured Solution**

30 mm Mount E-Stop (IP69K)

**Key Benefits**

- Withstands high pressure and high temperature washdown
- Certified to withstand cleaning chemicals used in the food processing industry
- 360° visible indication of E-Stop actuation
- Easy installation with no assembly or wiring required

# Packaging in Consumer Goods

From stand-up pouches packed in bliss boxes to plastic clam shells shrink-wrapped together, the size, shape and materials used to package a product are becoming increasingly diverse. To accommodate this diversity, packaging automation is becoming more intelligent to support a greater number of SKUs on production lines. With the accelerating pace of packaging automation comes greater need to safeguard packaging equipment.

# Solutions for Packaging in Consumer Goods Industry

see page 43

## Shiny Product Detection

**Challenge**

- Reflective, irregular shaped objects can cause erratic and inconsistent readings
- No gap between products as they come down the conveyor
- PLCs with slow scan times may not keep up with high speed lines

**Featured Solution**

Q4X

**Other Solutions**

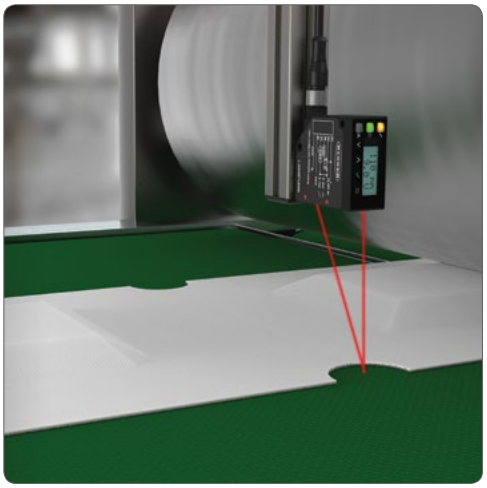
LTF

**Key Features**

- High excess gain and dynamically adjusted laser power
- Built-in Foreground Suppression Mode
- On-delay and off-delay logic built into sensor

**Key Benefits**

- Excess gain and dynamic laser power allows the sensor to reliably measure shiny objects at steep angles
- Foreground Suppression Mode allows a sensing window to be set on the apex of the container as it passes by
- Built-in on and off-delays can extend output time



see page 40

## Material Thickness—Diaper

**Challenge**

- Control thickness of absorbent material
- Porous or uneven material causes erratic reading
- Quickly change measurement range for product changeover

**Featured Solution**

LE 550/250

**Other Solutions**

Q4X

**Key Features**

- Laser triangulation distance measurement
- Advanced measurement algorithms
- Two-line, eight-character display with pushbutton programming

**Key Benefits**

- Repeatable and accurate measurements regardless of target's color or texture
- Perform average, max/min, measurement range readings instead of a single point measurement
- Easy setup, troubleshooting, and real-time feedback

see page 41

## Roll Diameter

**Challenge**

- Accurately measure roll diameter of various materials
- Large parent rolls of material
- Easy to setup without need to present full/empty roll

**Featured Solution**

LTF

**Other Solutions**

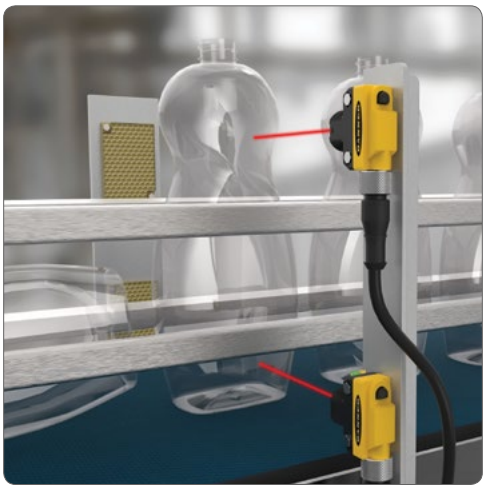
LE550

**Key Features**

- Repeatable sensing regardless of texture, color, or angle of target
- 12 m and 24 m ranges available
- Two-line, eight-character display with push button input

**Key Benefits**

- Accurate measurement reduces waste left on the core
- Long ranges for large rolls and easy alignment with visible laser spot
- Pushbutton interface allows for easy setup, adjustment, and troubleshooting



see page 45

## Clear Object Detection

**Challenge**

- Two sensors used to sense down bottle and prevent jams on filling line
- Containers can be plastic, glass, clear or opaque

**Key Features**

- Single-point teach mode
- Coaxial polarized optics

**Featured Solution**

QS18 Clear Object Detection

**Other Solutions**

Q4X

**Key Benefits**

- Easy teach process minimizes install time
- Coaxial optics ensure reliable sensing regardless of material or opacity

see page 46

## Fill Level

**Challenge**

- Sense underfilled bottles through an opaque container
- Need to see through plastic bottle, but not clear liquid inside
- Repeatable level control

**Key Features**

- 1450 nm wavelength LED emitter
- 8 m model QS30H2O sensor
- Apertures available

**Featured Solution**

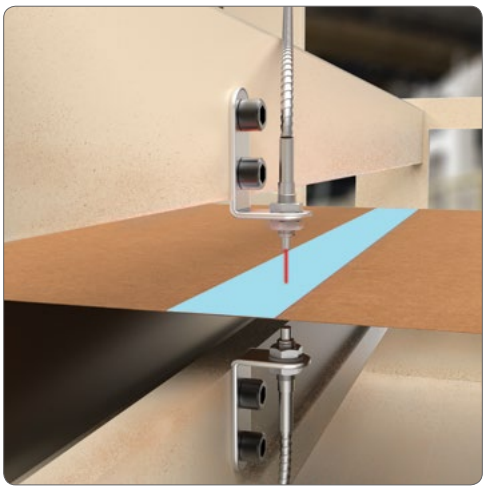
QS30H2O

**Other Solutions**

DF-G3LIR

**Key Benefits**

- Special wavelength that cannot see through water-based liquids
- Long range sensor can see through bottles, but not water-based liquid inside
- Use of apertures narrow the effective beam for precise fill level



see page 48

## Web Monitoring/ Splice Detection

**Challenge**

- Material texture and transparency vary
- Dusty environment
- Easy setup

**Key Features**

- Variety of opposed mode fiber arrays for edge guiding
- High excess gain with auto thresholding
- Option for mid-point teach mode

**Featured Solution**

DF-G3

**Key Benefits**

- Opposed mode fiber arrays minimize effects of changing textures and transparencies
- Able to burn through dust and compensate for dust that settles on fibers
- Mid-point teach learns the optimal web position with an easy single-point teach


see page 62

## Label and Cap Verification

**Challenge**

- Ensure cap integrity, label verification and bottle orientation before case packer
- High product changeover
- Vision systems can be complex and require computer software

**Key Features**

- Multiple vision tools in one inspection
- Save up to 30 inspections
- Configuration via integrated or remote display

**Featured Solution**

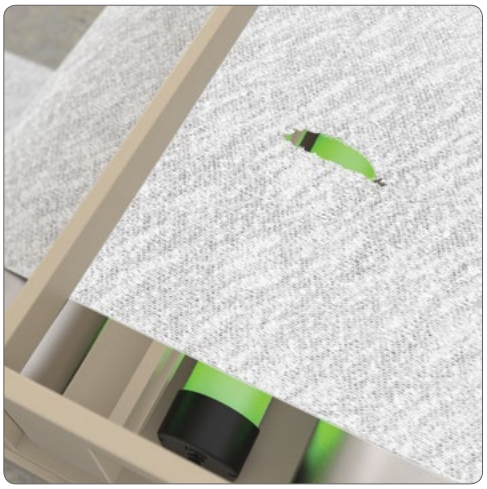
iVu Plus TG Gen2

**Other Solutions**

VE

**Key Benefits**

- One iVu vision sensor can inspect both cap and label using easy-to-use Match tool
- Preconfigured inspections reduce downtime between product changeovers
- No complex software to learn, easily troubleshoot problems through integral or remote screen



see page 70

## Visual Web Inspection

**Challenge**

- Operator visually inspects web of non-woven material for holes or thin spots
- Product changeover and operator changes require easy adjustability to get proper contrast
- Fluorescent lights require maintenance and risk of broken glass

**Key Features**

- Bright, uniform light
- Dimming capable via potentiometer or remote input
- Rugged metal housing, shatterproof light cover, long-lasting energy-efficient LEDs

**Featured Solution**

WLB92

**Other Solutions**

WLB32

**Key Benefits**

- Uniform light acts as backlight to see thin spots on web
- Easily dimmable to accommodate operator preferences and product changes
- Industrial-grade design provides maintenance-free illumination

see page 65

## Cabinet Lighting

**Challenge**

- Limited space inside panel
- Dark control panel makes it difficult to troubleshoot problems

**Key Features**

- 15 mm profile
- Completely sealed with an IP67 rating for use in wet or dusty environments

**Featured Solution**

WLS15

**Other Solutions**

WLB32

**Key Benefits**

- Low profile fits in tight spaces
- Will hold up and last a long time in tough environments

## E-Stop Safety

see page 58

**Challenge**

- Many E-stops in series make it difficult to tell which one is pressed
- Modular systems are time consuming to install

**Key Features**

- Green/Red lighted base
- 8-pin Quick-Disconnect

**Featured Solution**
30 mm Mount
E-Stop

**Other Solutions**

**Key Benefits**

- 360 visible indication of E-Stop actuation reduces downtime
- Easy installation with no assembly or wiring required

## Safety Light Curtain

see page 56

**Challenge**

- Safeguard palletizing machine
- Alignment of light curtains over large span
- In an area where accidental impact can occur and cause damage

**Key Features**

- End-to-end zone protection with no dip switches
- Bi-color alignment indicators
- Metal end caps, this aluminum housing with 5 mm recessed window

**Featured Solution**
EZ-SCREEN LS

**Other Solutions**
EZ-SCREEN LP

**Key Benefits**

- Intuitive, easy-to-use safety light curtains
- Highly visible indicators streamline alignment process and facilitate easy troubleshooting
- Heavy duty housing to avoid damage from impact

## Safety Monitoring

see page 60

**Challenge**

- Safeguard machine with variable safety add-ons depending on customer needs
- Complex logic or multiple safety scenarios
- Communicate with HMI to display machine status

**Key Features**

- Free, easy-to-use software using drag and drop function blocks
- Simulation mode
- Expandable I/O modules
- Ethernet and Profinet communications

**Featured Solution**
XS26-2 Safety Controller

**Other Solutions**
SC26-2

**Key Benefits**

- Configure safety program in minutes
- Test configuration without need to wire or purchase safety controller
- Base controller with 26 inputs and two dual-channel safety outputs can be expanded to fit machine requirements
- Ethernet-enabled models allows for easy communications with PLC or HMI

# Packaging in the Pharmaceutical Industry

Around the world, companies operating in the pharmaceutical manufacturing industries rely on Banner Engineering for our industry knowledge, experience and expertise to provide products and solutions that improve automation efficiency, maintain product quality, and protect operator safety.

Banner is an expert in advanced optics, LED, laser, and photoelectric circuits, offering sensors for tablet fill level monitoring and count verification, cap and closure inspection, print and label verification, and product identification and serialization. We have the industry's most complete family of safeguarding devices, allowing customers to design the highest level of safety into a machine, without compromising productivity. LED products from Banner provide clear status indication and bright, uniform illumination for machines, processes and workstations. We have a complete line-up of actuators, ideal for medical assembly, medical kitting and storage retrieval systems.

# Solutions for Packaging in the Pharmaceutical Industry

see page 43

## Clear Vial Detection

**Challenge**

- Reliably sense different vials of varying sizes, transparencies, and materials without a retroreflector
- Exposure to sterilizing chemicals

**Featured Solution**

Q4X (flush front)

**Other Solutions**

QM26 Clear Object Detection

QS18 Clear Object Detection

**Key Features**

- Algorithm uses distance and intensity for clear object detection
- FDA grade 316 Stainless Steel housing that is IP69K washdown rated and Ecolab certified

**Key Benefits**

- Reliably detect transparent objects without a reflector
- Reduced downtime from reflectors fogging up
- Reduced unscheduled down time from mechanical failure due to the SIP environment

see page 43

## Vibratory Feeder – Stopper Fill Level

**Challenge**

- Prevent frequent start/stops
- Reliably detect stoppers of different colors, sizes, and shapes

**Featured Solution**

Q4X

**Other Solutions**

Q60 (Adj. Field)
QS30 (Adj. Field)

**Key Features**

- Independent and adjustable on delays and off delays
- Reliably measure distance regardless of the surface reflectivity or color

**Key Benefits**

- Increase the vibratory bowl's product life by reducing the start/stop frequency by ignoring signal noise
- A single sensor and setup will work detect all stopper variations, reducing change over time

see page 49

## Liquid Level Detection

**Challenge**

- Detect liquid level in different color vials and bottles
- Limited space to mount a sensor

**Featured Solution**

DF-G3LIR Water sensor with a pair of IT43ST5-VL fiber optic bundle and L2 Lens

**Other Solutions**

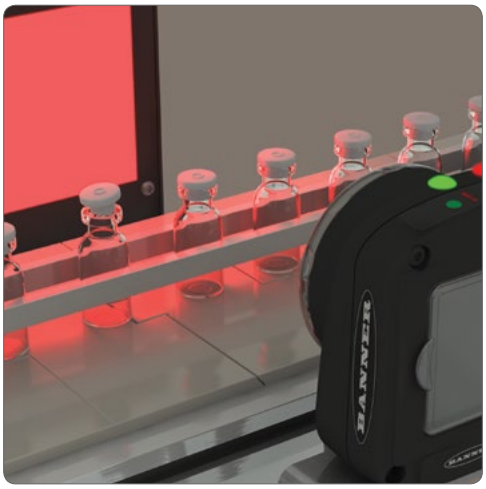
QS30H2O

**Key Features**

- Detect water-based liquids inside translucent or opaque plastic and glass containers
- Compatible with standard glass fibers

**Key Benefits**

- Reduce product waste by detecting underfilled vials early in the packaging process
- Quick and simple installation with many small fiber optic bundles styles to choose from



see page 62

## Raised/Missing Stopper inspection

**Challenge**

- The height of the vials can vary
- Do not want to support a complex “vision system”

**Featured Solution**

iVu Plus TG Gen2

**Other Solutions**

VE

Q4X

**Key Features**

- Find and inspect key features
- Integral and Remote Touch Screen for programming

**Key Benefits**

- No need to mechanically move the iVu Plus when the height of the vial changes, which reduces downtime
- Easy configuration without a PC reduces setup time


see page 64

## Label Verification

**Challenge**

- Position and type of the barcode on the label varies between product SKUs
- Ability to view inspection status without connecting to a PC

**Featured Solution**

iVu Plus BCR Gen2

**Other Solutions**

*Presence*PLUS OMNI

TCNM Barcode Reader

**Key Features**

- Imager-based barcode reader can read all the standard 1D and 2D barcodes within the sensing window
- Integral and Remote Touch Screen for configuring and viewing captured images

**Key Benefits**

- No required mechanical adjustments reduces changeover times
- Reduce unplanned down time by making all the necessary adjustment right on the integrated touch screen

see page 66

## Machine Illumination and Status Indication

**Challenge**

- Easily identify when the machine requires an operator intervention
- Hygienic requirements and shatterproof design inside a packaging area

**Featured Solution**

WLS27 (Dual Color)

**Other Solutions**

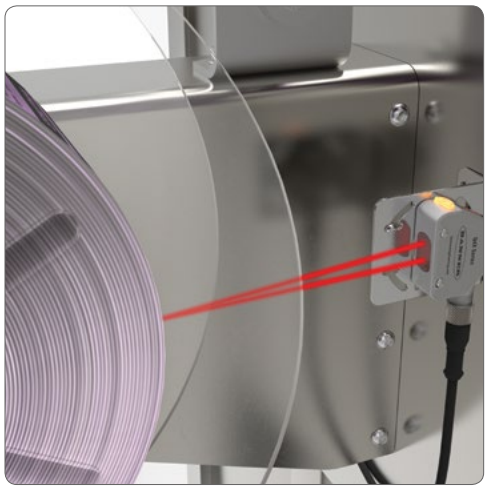
WLS28-2 (Dual Color)

**Key Features**

- Ability to switch between colors from a 24 V dc input
- Encased in a shatterproof, chemically resistant, IP69K copolyester shell

**Key Benefits**

- Quickly identify the machine requiring operator intervention by illuminating the entire machine
- Reduce installation costs by installing the worklight without an additional protective housing



see page 43

## Roll Diameter Measurement to Reduce Waste

**Challenge**

- Flexible packaging often contains vibrant, multi-colored, graphics of varying reflectivity that can be difficult to reliably sense
- Varying size of roll stock increases changeover time when sensors need to be adjusted

**Featured Solution**

Q4X

**Other Solutions**

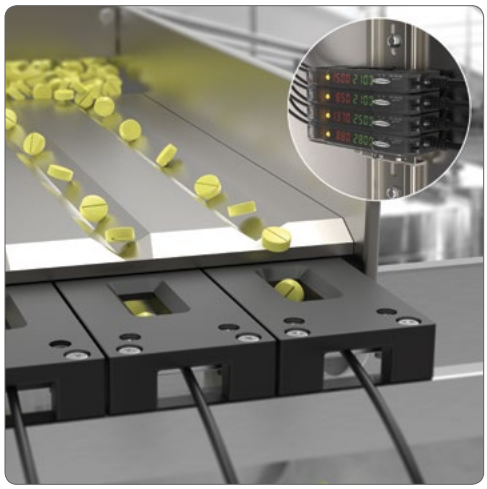
LE250
S18U

**Key Features**

- Uses laser triangulation with linear array technology
- Ready to measure right out of the box or can be programmed with the integrated LCD display

**Key Benefits**

- Ensures repeatability and accuracy for challenging targets regardless of color, reflectivity, or angle
- Reduces downtime with rapid product changeovers



see page 48

## Tablet Counting During Bottle Filling

**Challenge**

- Tablet dust can accumulate in the environment
- Tablet can be as small as 2 mm in diameter

**Featured Solution**

DF-G3 Small Object with PGIRS66U-40 fiber

**Other Solutions**

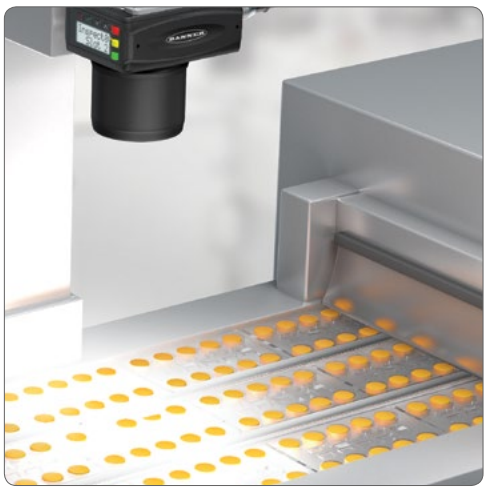
D10 Amp with
PFCVA-25X25-E fiber

**Key Features**

- Automatic Gain Compensation (AGC) algorithm compensates for dust build-up on fiber optics
- 40 mm fiberoptic array can detect objects as small as 2 mm

**Key Benefits**

- Increase the time between scheduled maintenance by extending the counting cycle and maintain count accuracy as dust increases during production
- Improve process flexibly by detecting even the smallest tablet in a large 40 mm area



see page 61

## Blister Filling Inspection

**Challenge**

- Partial tables can fall into a blister cavity
- The size of the blister pack and number of blisters per pack change frequently

**Featured Solution**

VE

**Other Solutions**

iVu Plus

**Key Features**

- 2 megapixel imager
- Store hundreds of configurations on the VE smart camera
- Standard Ethernet communication protocols like Etherent/IP, and FTP

**Key Benefits**

- Detect small defects and partial tablets
- Rapid product changeovers
- Easily export results and images to central database

## E-Stop Safety—Pharmaceutical Isolator

see page 58

**Challenge**

- Harsh environment with exposure to cleaning chemicals
- Difficult to tell what E-Stop is pressed when wired in series
- Modular systems are time consuming to install

**Key Features**

- IP69K FDA Grade Silicon cover
- Ecolab certified
- Green/Red lighted base
- 8-pin Quick-Disconnect

**Featured Solution**

30 mm Mount
E-Stop (IP69K)

**Key Benefits**

- Certified to withstand cleaning chemicals used in the pharmaceutic industry
- 360° visible indication of E-Stop actuation
- Easy installation with no assembly or wiring required

## Safety Light Curtain—Pharmaceutical Isolator

see page 56

**Challenge**

- Safety light curtains that scan across the isolator internally must be easily cleaned and hold-up to the sterilization process
- Safeguarding large filling and packaging systems have multiple safeguarding points and zones

**Key Features**

- IP67/IP69K, hygienically designed and chemically-resistant tubular enclosed EZ-SCREEN LS
- Scalable safety solution

**Featured Solution**

EZ-SCREEN LS
(IP69K)

**Other Solutions**

EZ-SCREEN LP

**Key Benefits**

- Designed to work in the harsh environment of a sterile filling and packaging systems

## Safety Monitoring

see page 60

**Challenge**

- Safeguard machine with variable safety add-ons depending on customer needs
- Complex logic or multiple safety scenarios
- Communicate with HMI to display machine status

**Key Features**

- Free, easy-to-use software using drag and drop function blocks
- Simulation mode
- Expandable I/O modules
- Ethernet and Profinet communications

**Featured Solution**

XS26-2

**Other Solutions**

SC26-2

**Key Benefits**

- Configure safety program in minutes
- Control and monitor all the safety devices on the filling equipment
- Test configuration without need to wire or even own safety controller
- Base controller with 26 inputs and two dual-channel safety outputs can be expanded to fit machine requirements
- Ethernet-enabled models allow for easy communications with PLC or HMI

# Solutions for Remote Monitoring

Real-time monitoring of machine status allows supervisors to address any issues as they arise, minimizing machine downtime and potentially resolving small issues before they become big problems. Providing clear indication of status at a machine is a necessary requirement. Communicating that status information from a machine to other devices makes it possible for personnel to monitor multiple machines on a factory floor from a convenient location.

# Solutions for Remote Monitoring

see page 54

## Temperature and Vibration Monitoring

**Challenge**

- Off-line motor testing requires costly down time and can miss changes between testing
- On-line or dynamic testing may neglect key symptoms that indicate motor decline

**Featured Solution**

QMV42VT1 or QMV42T2 (with DX80 nodes, Q45U Nodes, or MultiHop Modbus RTU radios)

**Key Features**

- Sensor continuously monitors RMS velocity and temperature to detect problems early
- Monitor remotely using wireless I/O instead of running cable
- Schedule maintenance without disrupting production by getting email or text in real time when vibration threshold has been exceeded

**Key Benefits**

- Automate the testing process to save time and better predict mechanical failure
- Save maintenance costs by scheduling motor rework rather than unplanned downtime

see page 55

## Temperature and Humidity Monitoring

**Challenge**

- Running power and signal wire to sensors may require long conduit runs overhead or underground
- Conduit runs over production lines lead to costly downtime
- Checking temperature and humidity manually is time consuming and the human factor can lead to errors

**Featured Solution**

M12FTH (with DX80 Node, Q45U Node, or MultiHop Modbus RTU radios)

**Key Features**

- Battery-powered nodes with compatible temperature and humidity sensors are perfect for ease of installation
- Temperature accuracy of +/- 0.3 °C and humidity accuracy of +/- 2% relative humidity
- Signal is transmitted wirelessly over radio frequencies
- Up to 47 nodes can be added per gateway creating an efficient network collecting data from multiple points

**Key Benefits**

- Effective solution that reduces the scrap product from out of specification temperatures or humidity
- Easily monitor environmental conditions in locations previously too difficult or expensive to access

see page 51

## Barrel, Tote, or Tank Level Inspection

**Challenge**

- Difficult to tell how much liquid product is in a barrel, tote or tank
- Running out of product at the wrong time can be a hassle and create unnecessary production loss
- Running cables for power and signal wires to barrels, totes or tanks for automatic level monitoring can be expensive and creates a potential tangled mess as items are moved around

**Featured Solution**

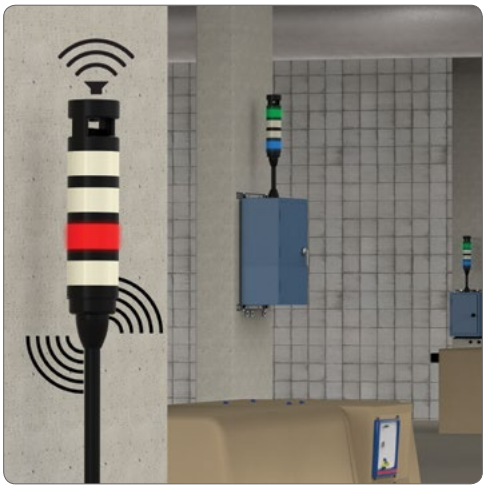
K50U Ultrasonic (with DX80 Node, Q45U Node, or MultiHop Modbus RTU radios)

**Key Features**

- Ultrasonic sensor specifically for tank level monitoring, is optimized for power consumption and has threaded housing to fit a bung of a barrel or tote
- Utilizes power from batteries inside the node for ease of installation and use
- Signal can be monitored remotely with no cables by using wireless radio waves

**Key Benefits**

- Easily monitor remote and mobile barrels, totes and tanks
- Empty barrels are switched with full ones in a timely manner with no production loss
- Manage inventory with real time data indicating when to re-order materials



see page 74

## Machine Indicator Tower Lights with Wireless Connectivity

**Challenge**

- Placing indicators in locations that don't have an existing signal cable
- Long conduit runs are costly and installation may cause unnecessary down time
- Legacy machines often don't have the ability to send data to the network

**Featured Solution**

TL70 Wireless Tower Light

**Key Features**

- Flexible solution for placing an indicator in the desired location
- Line of sight range of signal is up to 2 miles
- Bright LED's for easy visual monitoring of a machine's condition
- Wireless connectivity enables machine status to be collected on legacy machines

**Key Benefits**

- Wireless connectivity results in more uptime and efficient troubleshooting
- Easy installation compared to hard wiring tower lights into the network


see page 53

## Line Throughput/Scoreboarding/Part Counting

**Challenge**

- Monitoring machine production throughput requires time-consuming electrical installation
- Each machine and production line may have unique product detection needs

**Featured Solution**

Q4X
DXM100

**Key Features**

- Nodes on a machine monitor the signal on existing sensors and wirelessly transmit the signal back to a Gateway
- Log the data and communicate to the network or the cloud
- Show production metrics on scoreboard

**Key Benefits**

- Easy and cost effective installation
- Add counting capabilities to legacy machines

see page 78

## Wireless Clean Room Indication

**Challenge**

- Monitor the status of each clean room in one central location without adding long conduit runs
- Signal personnel when it is safe to enter and exit the clean room.

**Featured Solution**

K70L Wireless
DXM100

**Key Features**

- Up to 47 wireless nodes can wirelessly send a wide variety of data to a central gateway.
- Logic controller with action rules and ScriptBasic programming

**Key Benefits**

- Without adding additional wiring, send current temperature, humidity, pressure and entry/exit door status from every clean room to a central monitoring room
- Wirelessly activate an indication light and lock or unlock the entry/exit doors based on the room parameters

# Products

IO-Link®

# LE Series

## Laser Sensor

- The LE laser sensors are ready to measure right out of the box with easy adjustment, setup and use.
- Easy adjustment with a two-line, eight-character intuitive display
- Repeatability and accuracy for challenging targets, from metal to black rubber
- Visible 2 laser for small spot size and simple alignment
- Applications see page 10, 16, 24

| Family | Range | Output | Laser Class | Connector |
|---|---|---|---|---|
| LE | 550 | I | | Q |
| | **550** =100-1000 mm<br>**250** =100-400 mm | **I** = 4 to 20 mA analog and (1) NPN/PNP discrete<br>**U** = 0 to 10 V analog and (1) NPN/PNP discrete<br>**D** = (2) NPN/PNP discrete<br>**K** = Dual Discrete with IO-Link<br>NOTE: Discrete NPN/PNP is user configurable | **Blank** = Class 2<br>**C1** = Class1 | **Blank** = 2 m Integral Cable<br>**Q** = Rotatable M12 Euro QD<br>**QP** = PVC M12 Euro Pigtail QD<br>**W/30** = 9 m Integral Cable |

**RWAMSLE**
replacement windows

**SMBAMSLEIP**
full assembly with plate and wo protective windows

**SMBAMSLTFP**
mounting plate

**SMBLEU**

**SMBLEL**

**SMBLEFA**

**5-pin M12 Euro-Style with Shield**

**MQDEC2-515**
**MQDEC2-515RA**
5 m (15')

Additional lengths available on bannerengineering.com

## Specifications

| | |
|---|---|
| **Supply Voltage and Current** | 12 to 30 V dc<br>Normal Run Mode: 1.7 W, Current consumption less than 70 mA at 24 V dc |
| **Sensing Beam** | Visible red Class 2 laser, 650 nm |
| **Construction** | Housing: die-cast zinc Lens: polycarbonate |
| **Environmental Rating** | IP67, NEMA 6 |
| **Operating Conditions** | Temperature: –20 to +55 °C Humidity: 90% at +55 °C |
| **Certifications** | CE cULus LISTED |

IO-Link®

# LTF Series

## High-Performance Laser Time-of-Flight

- Best in class combination of range, repeatability and accuracy enable highly reliable target detection and precise distance measurement
- Two-line, eight-character display and push-button programming for easy setup, troubleshooting and real-time distance measuring
- Durable IP67 housing, high ambient light immunity and stable performance across temperatures provide reliable performance in challenging environments
- Advanced options, including delay timers, advanced triggered measurement modes and cross-talk avoidance
- Applications see page 10, 24

| Family | Range (m) | Output | Laser Class | Sensing Mode | Connector |
|---|---|---|---|---|---|
| LTF | 12 | I | C2 | LD | Q |
| | **12** = 12<br>**24** = 24 | **I** = 4 to 20 mA analog and (1) NPN/PNP discrete<br>**U** = 0 to 10 V analog and (1) NPN/PNP discrete<br>**K** = Dual Discrete with IO-Link<br>NOTE: Discrete NPN/PNP is user configurable | **C2** = Class 2 | **LD** = Laser diffuse | **Blank** = 2 m Integral Cable<br>**Q** = Rotatable M12 Euro QD<br>**QP** = PVC M12 Euro Pigtail QD<br>**W/30** = 9 m intergal cable |

**SMBLTFL**

**SMBLTFU**

**SMBAMSSLTFP**

**SMBLTFFA**
includes 3/8" bolt for mounting
**SMBLTFFAM10**
includes 10 mm bolt for mounting
**SMBLTFFAM12**
clamps directly onto industry standard bracket systems of 1/2" or 12 mm rods

**5-pin M12 Euro-Style with Shield**

**MQDEC2-515**
**MQDEC2-515RA**
5 m (15')

**4-pin M12 Euro-Style Double-ended**
Use for: IO-Link Models

**MQDEC2-412**
**MQDEC2-412RA**
4 m (12')

Additional lengths available on bannerengineering.com

## Specifications

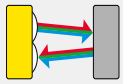
| | |
|---|---|
| **Supply Voltage and Current** | 12 to 30 V dc |
| **Sensing Beam** | Visible red laser; class 2 |
| **Range** | 50 to 24000 mm (1.97 to 472.44 in) |
| **Response Time** | Fast: 1.5 ms Standard: 8 ms Medium: 32 ms Slow: 256 ms |
| **Beam Spot Size** | Distance (mm) / Size<br>50 / 6.5 mm<br>7500 / 10 mm<br>12000 / 12.5 mm<br>24000 / 35 mm |
| **Repeatability (1σ)** | ±0.15 to 2 mm (Slow 256 ms shown. For more info see datasheet.) |
| **Resolution** | < 0.3 to 3 mm (Resolution measured as twice repeatability with white target at slow response speed at 20 °C) |
| **Construction** | Die-cast zinc housing; acrylic window |
| **Environmental Rating** | IEC IP67; NEMA 6 |
| **Operating Conditions** | Temperature: –20 to +55 °C Humidity: 90% at +55 °C maximum relative humidity (non-condensing) |
| **Certifications** | CE c UL us LISTED |


# R58E Series

## Registration Mark Sensor

- The R58E sensors offer maintenance-free, solid-state reliability for color contrast applications. With a fast, 50-microsecond sensing response time, the R58E provides excellent registration repeatability, even in speedy applications.
- Bipolar outputs
- 10,000 actuations per second and 15 microsecond repeatability
- Rugged mechanical housing rated to IP67
- Applications see page 18

Visible Red, Green or Blue LED, depending on registration mark

| Sensing Mode/LED | Focus | Connection | Output Type | Models: Parallel | Models: Perpendicular |
|---|---|---|---|---|---|
|  CONVERGENT | 10 mm | 2 m | Bipolar NPN/PNP | R58ECRGB1 | R58ECRGB2 |
| | | 5-pin Euro Pigtail QD | Bipolar NPN/PNP | R58ECRGB1Q | R58ECRGB2Q |
| | | 2 m | PNP | R58BPCRGB1 | R58BPCRGB2 |
| | | 5-pin Euro Pigtail QD | PNP | R58BPCRGB1Q | R58BPCRGB2Q |
| | | 2 m | NPN | R58BNCRGB1 | R58BNCRGB2 |
| | | 5-pin Euro Pigtail QD | NPN | R58BNCRGB1Q | R58BNCRGB2Q |


SMB55A


SMB55RA


SMB55F


SMB55S

**5-pin Euro-Style**
Used with: *Expert* models

**MQDEC2-515**
**MQDEC2-515RA**
5 m (15')

**4-Pin Euro-Style**
Used with: R58 models

**MQDC-415**
**MQDC-415RA**
5 m (15')

Additional lengths available on bannerengineering.com

## Specifications

| | |
|---|---|
| **Supply Voltage and Current** | 10 to 30 V dc (10% max. ripple)<br>R58A: 36 mA exclusive of load<br>R58B & R58E: 75 mA @ 10 V dc<br>35 mA @ 30 V dcw |
| **Output Configuration** | R58 Expert & R58A: Bipolar: One current sourcing (PNP) and one current sinking (NPN)<br>R58B: Single output: One current sourcing (PNP) or one current sinking (NPN) |
| **Output Response Time** | 50 microseconds |
| **Repeatability** | 15 microseconds |
| **Construction** | Zinc alloy die-cast housing with black painted finish and o-ring sealed lens port cap<br>Lens: Acrylic<br>Lens port cap and lens holder: ABS<br>Sensitivity and LO/DO adjusters: Acetal<br>QD: Anodized aluminum |
| **Environmental Rating** | IEC IP67 |
| **Operating Conditions** | Temperature: R58E: –10 to +50 °C<br>R58A & R58B: –10 to +55 °C<br>Relative humidity: 90% at 50 °C (non-condensing)<br>Storage temperature: –20 to +80 °C |
| **Certification** | CE |

IO-Link®

# Q4X Series

## Laser Measurement Sensor

- Save time and money with the Q4X which is ready to measure right out of the box
- A simple user experience from installation to setup
  - Bright spot alignment
  - Three push buttons simplify setup
  - Intuitive menus
- Four-digit display shows distance to target in mm
- FDA-grade stainless steel is suitable for IP69K washdown environments
- Applications see page 10, 16, 24, 30, 32

### Threaded

| Family | Housing Style | Output | Mode | Range | | Connector |
|---|---|---|---|---|---|---|
| Q4X | T | B | LAF | 300 | – | Q8 |

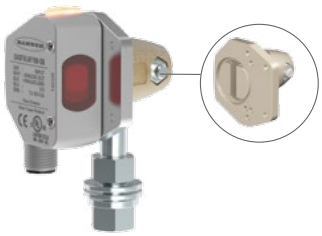
- **T** = 18 mm Threaded Barrel
- **B** = Bipolar Discrete NPN & PNP†
- **K** = Dual Discrete with IO-Link
- **U** = 0 to10 V Analog
- **I** = 4 to 20 mA Analog
- **LAF** = Laser Adjustable-Field
- **COD** = Clear Object
- **600** = 25-600 mm*
- **500** = 25-500 mm**
- **300** = 25-300 mm††
- **100** = 25-100 mm
- **Q8** = Integral QD

### Flush

| Family | Housing Style | Output | Mode | Range | | Connector |
|---|---|---|---|---|---|---|
| Q4X | F | N | LAF | 310 | – | Q8 |

- **F** = Flush face
- **P** = PNP
- **N** = NPN
- **K** = Dual Discrete with IO-Link
- **U** = 0 to10 V Analog
- **I** = 4 to 20 mA Analog
- **LAF** = Laser Adjustable-Field
- **610** = 35-610 mm*
- **310** = 35-310 mm
- **110** = 35-110 mm
- **Q8** = Integral QD

* Only available in Dual Discrete with IO-Link models
** Not available in Dual Discrete with IO-Link models
† Clear Object models only available with bipolar output
†† Clear object only this range



**SMBQ4XFA**
includes 3/8" bolt for mounting

**SMBQ4XFAM10**
includes 10 mm bolt for mounting

**SMBQ4XFAM12**
clamps directly onto industry standard bracket systems of 1/2" or 12 mm rods

**SMB18A**

**SMBAMS18P**

**5-pin Euro-Style**
Used with: Analog models
**MQDEC2-515**
**MQDEC2-515RA**
5 m (15')

**5-Pin Washdown Euro-Style**
Used for: Analog Washdown
**MQDCWD-506**
2 m (6.5')

**4-pin Euro-Style**
Used with: NPN, PNP, Dual Discrete
**MQDC-415**
**MQDC-415RA**
5 m (15')

**5-pin Euro-Style**
Used with: Bipolar
**MQDC1-515**
**MQDC1-515RA**
5 m (15')

**4-Pin Washdown Euro-Style**
Used for: NPN, PNP, Dual Discrete
**MQDC-WDSS-0415**
5 m (15')

**5-Pin Washdown Euro-Style**
Used for: Bipolar
**MQDC-WDSS-0515**
5 m (15')

Additional lengths available on bannerengineering.com

## Specifications

| | |
|---|---|
| **Supply Voltage and Current** | 10 to 30 V dc at less than 675 mW  12 to 30 V dc for Analog models |
| **Sensing Beam** | Visible red Class 1 laser, 655 nm |
| **Output Response Time** | User selectable: 50 ms, 25 ms, 10 ms, 3 ms and 1.5 ms |
| **Construction** | Housing 316 L stainless steel; PMMA acrylic lens cover, Polysulfone lightpipe and display window |
| **Environmental Rating** | IP67 per IEC60529; IP68 per IEC60529; IP69K per DIN40050-9 |
| **Operating Conditions** | Temperature: –10 °C to +50 °C  Humidity: 35% to 95% relative humidity |
| **Certifications** | CE c UL us LISTED ECOLAB chemical compatibility on some models; contact Banner Engineering for details |

# QS18 Laser

## DC-Operated Long-Range Laser Sensors

- Narrow visible beam spot for easy alignment and small object detection
- Long sensing ranges
- Available in opposed, diffuse and retroreflective mode
- Applications see page 16

| Family | Output | Power | Sensing Mode | | Connector |
|---|---|---|---|---|---|
| QS18 | VP | 6 | LLP | – | Q8 |
| | **VN** = NPN<br>**VP** = PNP | **6** = DC power | **LLP** = Polar retro | | **Blank** = 2 m Integral Cable<br>**Q8** = M12 4-pin Euro QD |

SMBQ4XFA

SMBQS18A

SMB18A

SMBQS18AF

SMB18SF

4-pin M12 Euro-Style

**MQDC-415**
**MQDC-415RA**
5 m (15')

4-pin M12 Euro-Style with Shield

**MQDEC2-415**
**MQDEC2-415RA**
5 m (15')

Additional lengths available on bannerengineering.com

## Specifications

| | |
|---|---|
| **Supply Voltage and Current** | 10 to 30 V dc (10% max. ripple) at less than 35 mA |
| **Output Response Time*** | 700 microseconds ON/OFF |
| **Repeatability*** | 130 microseconds |
| **Construction** | Housing: ABS<br>Lens Cover: acrylic<br>Window: PMMA |
| **Environmental Rating** | Rated IEC IP67; NEMA 6; UL Type 1 |
| **Operating Conditions** | Temperature: -10° to +50 °C<br>Relative humidity: 90% @ 50 °C (non-condensing) |
| **Certifications** | CE |

IO-Link®

# QS18 *Expert*™

## Clear Object Detection Sensor

- Response speed of 400 µs ON/OFF
- Coaxial optics and small spot size for applications with space limitations
- ClearTracking algorithm provides reliable operation by compensating for dust build-up and ambient temperature changes
- Applications see page 11, 17, 25

| Family* | Output | Power | Sensing Mode | | Connector |
|---|---|---|---|---|---|
| QS18E | P | 6 | XLPC | – | Q8 |

**Output**
- **N** = NPN
- **P** = PNP
- **K** = Programmable PNP or NPN with IO-Link

**Power**
- **6** = DC power

**Sensing Mode**
- **XLPC** = Polar retro with coaxial optics

**Connector**
- **Blank** = 2 m Integral Cable
- **Q** = M8 4-pin Pico Pigtail QD
- **Q5** = M12 4-pin Euro Pigtail QD
- **Q7** = M8 4-pin pico QD
- **Q8** = M12 4-pin Euro QD

* All models require a reflector

SMBQ4XFA

SMBQS18A

SMB18A

SMBQS18AF

SMB18SF

4-pin M12 Euro-Style

MQDC-415
MQDC-415RA
5 m (15')

4-pin M8 Pico-Style

PKG4M-5
PKW4M-5
5 m (15')

Additional lengths available on bannerengineering.com

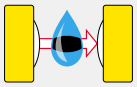
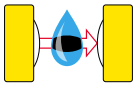
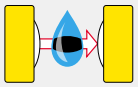
## Specifications

| | |
|---|---|
| **Supply Voltage** | 10 to 30 V dc (10% max. ripple) at less than 35 mA, exclusive of load; 10 to 24 V dc @ greater than 55° C |
| **Output Response Time** | 400 microseconds ON/OFF |
| **Repeatability** | 100 microseconds |
| **Range** | Depends on reflector |
| **Construction** | Housing: ABS Window: PMMA |
| **Environmental Rating** | Meets NEMA 6; IEC IP67; UL Type 1 |
| **Operating Conditions** | Temperature: -20° to +70° C Relative humidity: 90% @ 50° C (non-condensing) |
| **Certifications** | CE cULus |

# QS30 Water Detection

## DC-Operated Long-Range Sensors

- Ability to work reliably in low contrast applications
- Ability to detect liquid in translucent and opaque bottles
- 1450 nm infrared wavelength to enhance contrast of clear liquids
- Applications see page 17, 25

| Sensing Mode | Range | Connection | Output Type | Model (⇨ Infrared LED) |
|---|---|---|---|---|
|  OPPOSED WATER DETECTION | 4 m | 2 m 5-pin Euro Pigtail QD<br>2 m 5-pin Euro Pigtail QD<br>2 m 5-pin Euro Pigtail QD<br>2 m 5-pin Euro Pigtail QD | —<br>Bipolar NPN/PNP LO<br>Bipolar NPN/PNP DO<br>Analog 0-10 V | **QS30EXH2O Emitter***<br>**QS30EXH2OQ5 Emitter***<br>**QS30ARXH2O**<br>**QS30ARXH2OQ5**<br>**QS30RRXH2O**<br>**QS30RRXH2OQ5**<br>**QS30RXH20U**<br>**QS30RXH20UQ5** |
|  OPPOSED WATER DETECTION | 2 m | 2 m 5-pin Euro Pigtail QD<br>2 m 5-pin Euro Pigtail QD | Bipolar NPN/PNP LO<br>Bipolar NPN/PNP DO | **QS30ARH2O**<br>**QS30ARH2OQ5**<br>**QS30RRH2O**<br>**QS30RRH2OQ5** |
| SUPER HIGH-POWER  OPPOSED WATER DETECTION | 8 m | 2 m 5-pin Euro Pigtail QD<br>2 m 5-pin Euro Pigtail QD<br>2 m 5-pin Euro Pigtail QD | —<br>Bipolar NPN/PNP LO<br>Bipolar NPN/PNP DO | **QS30EXSH2O Emitter***<br>**QS30EXSH2OQ5 Emitter***<br>**QS30ARXSH2O**<br>**QS30ARXSH2OQ5**<br>**QS30RRXSH2O**<br>**QS30RRXSH2OQ5** |

**SMBQS30L**

**SMBQS30Y**

**SMBQS30YL**

**SMB30A**

**5- pin Euro QD (for Q models)**

**MQDC1-515** 5 m (15')
**MQDC1-515RA** 5 m (15')

Additional lengths available on bannerengineering.com

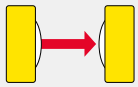
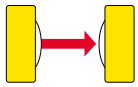
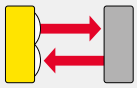
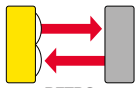
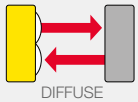
## Specifications

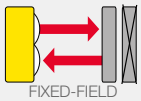
| | |
|---|---|
| **Supply Voltage and Current** | Emitters (Water): 10 to 30 V dc (10% max. ripple) at less than 80 mA<br>Receivers (Water): 10 to 30 V dc (10% max. ripple) at less than 65 mA<br>Analog Receivers (water): 15 to 30 V dc (10% max. ripple) at less than 65 mA (exclusive of load) |
| **Output Configuration** | Bipolar: One PNP (current sourcing) and one NPN (current sinking); Light Operate (LO) or Dark Operate (DO) selectable or configurable (depending on model) |
| **Output Response Time** | Opposed (Water): 10 x excess gain or more– Standard: 1 millisecond ON/OFF; Super High-Power: 10 milliseconds ON/OFF<br>2x to 10x excess gain– Standard: 3 milliseconds ON/OFF; Super High-Power: 30 milliseconds ON/OFF |
| **Repeatability** | Opposed (Water): 10 x excess gain or more– Standard: 500 microseconds; Super High-Power: 5 milliseconds<br>2x to 10x excess gain– Standard: 2.5 milliseconds; Super High-Power: 25 milliseconds |
| **Construction** | Housing: ABS plastic<br>Lens cover: acrylic |
| **Environmental Rating** | Opposed (Water): IEC IP67 (nema 6); PW12 1200 PSI washdown per NEMA PW12 |
| **Operating Conditions** | Opposed (Water), Opposed (High-Power): -20° to +60° C; Relative humidity: 90% (non-condensing)g) |
| **Certifications** | CE |

# T18-2 Series

## Epoxy Encapsulated Right-Angle Sensor

- Chemically robust epoxy encapsulated plastic sensors for wash-down applications
- Permanent laser etched product marking will not wear off after repeated cleaning cycles
- Food grade plastics materials used for all exposed surfaces
- Powerful and bright visible red emitter beam for easy alignment and set-up
- Highly visible output and dual-function power and stability indicators
- Advanced ASIC technology makes sensor resistant to optical and electrical noise source
- Applications see page 12, 19

| Sensing Mode | Range | Output Type | Model* ⇨ Infrared LED |
|---|---|---|---|
|  OPPOSED | 25 m | — | **T18-2NAEL-2M Emitter** |
| | 25 m with beam inhibit | | **T18-2NAEJ-2M Emitter** |
| | 25 m with adjustment | | **T18-2NAES-2M Emitter** |
|  OPPOSED | 25 m | Complementary NPN | **T18-2VNRL-2M Reciever** |
| | | Complementary PNP | **T18-2VPRL-2M Reciever** |
| | 25 m with adjustment | Complementary NPN | **T18-2VNRS-2M Reciever** |
| | | Complementary PNP | **T18-2VPRS-2M Reciever** |
|  POLARIZED RETRO | 6 m with BRT-84 reflector | Complementary NPN | **T18-2VNLP-2M** |
| | | Complementary PNP | **T18-2VPLP-2M** |
| | 6 m with BRT-84 reflector, with adjustment | Complementary NPN | **T18-2VNLPC-2M** |
| | | Complementary PNP | **T18-2VPLPC-2M** |
|  RETRO | 7.5 m with BRT-84 reflector, with adjustment | Complementary NPN | **T18-2VNLV-2M** |
| | | Complementary PNP | **T18-2VPLV-2M** |
|  DIFFUSE | 750 mm with adjustment | Complementary NPN | **T18-2VNDL-2M** |
| | | Complementary PNP | **T18-2VPDL-2M** |
| | 300 mm with adjustment | Complementary NPN | **T18-2VNDS-2M** |
| | | Complementary PNP | **T18-2VPDS-2M** |

| Sensing Mode | Range | Output Type | Model with Red Emitter* | Model with Infrared Emitter* |
|---|---|---|---|---|
|  FIXED-FIELD | 30, 50, 75, 100, 150, 200 mm replace ".." in model number with range required | Complementary NPN | **T18-2VNFF..-2M** | **T18-2VNFF..IR-2M** |
| | | Complementary PNP | **T18-2VPFF..-2M** | **T18-2VPFF..IR-2M** |

* Only 2 m (6.5 ft) PVC cable models are listed. To order 9 m (30 ft) PVC cable models, add suffix "9M" (for example, T18-2VNDL-9M).
To order 4-pin Euro M12 integral QD models, add suffix "Q8" (for example, T18-2VNDL-Q8).

**SMB18A**

**SMB18FA..**
Stainless steel models available

**4-pin Euro-Style**
Used with: NPN, PNP, Dual Discrete

**MQDC-415**
**MQDC-415RA**
5 m (15')

**4-Pin Washdown Euro-Style**
Used for: NPN, PNP, Dual Discrete

**MQDC-WDSS-0415**
5 m (15')

Additional lengths available on bannerengineering.com

## Specifications

| | | |
|---|---|---|
| **Supply Voltage and Current** | 10 to 30 V dc for ambient temperature ≤ 55 °C | 10 to 24 V dc for ambient temperature > 55 °C |
| **Output Configuration** | Complementary PNP or NPN by model number | |
| **Output Response Time** | Response is independent of signal strength<br>Opposed models: 1.5 milliseconds ON, 1 millisecond OFF<br>Retro, Polarized Retro, and Diffuse models: 1.5 milliseconds ON, 0.75 milliseconds OFF | Fixed Field models: 2 milliseconds ON, 2 milliseconds OFF<br>Delay on Power-up: 100 milliseconds; outputs do not conduct during this time |
| **Repeatability** | Repeatability is independent of signal strength<br>Opposed models: 170 microseconds | Retro, Polarized Retro, and Diffuse models: 100 microseconds<br>Fixed Field models: 200 microseconds |
| **Construction** | Housing, M12 QD, and cover: Black or Yellow PBT polyester<br>Indicator windows: Clear PBT polyester | Indicator cover and gain pot driver: PBT polyester<br>Front window: PMMA |
| **Environmental Rating** | IEC IP69K | |
| **Operating Conditions** | –40 °C to +70 °C (–40 °F to +158 °F) | 95% at +50 °C maximum relative humidity (non-condensing) |
| **Certifications** | | |

IO-Link®

# DF-G3 Series

## Long-range Fiber Optic Amplifiers

- World-class long-range sensing capability, more than 3 m (10 ft) with opposed mode fibers
- Easy to read dual digital displays show both signal level and threshold simultaneously
- Cross-talk avoidance function allows seven inspections in dense sensing point applications
- Models with IO-Link enable a point-to-point communication link between a master device and a sensor, facilitating remote monitoring, teaching, and configuration
- Operator control of the sensitivity (hysteresis) provides additional detection sensitivity, or a stabilized output depending on the application details
- Applications see page 25, 32

### IO-Link

Visible Red LED  Infrared LED

| Sensing Beam Color | Range | Connection | Output | Models |
|---|---|---|---|---|
| Visible Red, 635 nm | 3,000 mm | 2 m | Channel1: IO-Link, push/pull<br>Channel2: PNP only output, or input | **DF-G3-KD-2M** |
| Infrared, 850 nm | 6,000 mm | 2 m | Channel1: IO-Link, push/pull<br>Channel2: PNP only output, or input | **DF-G3IR-KD-2M** |

### Single Output

Visible Red LED  Infrared LED

| Sensing Beam Color | Range | Connection | NPN Models | PNP Models |
|---|---|---|---|---|
| Visible Red | 3,000 mm | 2 m | **DF-G3-NS-2M** | **DF-G3-PS-2M** |
| Infrared, 850 nm | 6,000 mm | 2 m | **DF-G3IR-NS-2M** | **DF-G3IR-PS-2M** |

### Dual Output

Visible Red LED  Infrared LED

| Sensing Beam Color | Range | Connection | NPN Models | PNP Models |
|---|---|---|---|---|
| Visible Red | 3,000 mm | 2 m | **DF-G3-ND-2M** | **DF-G3-PD-2M** |
| Infrared, 850 nm | 6,000 mm | 2 m | **DF-G3IR-ND-2M** | **DF-G3IR-PD-2M** |

### Analog

Visible Red LED  Infrared LED

| Sensing Beam Color | Range | Connection | Analog Output | NPN Models | PNP Models |
|---|---|---|---|---|---|
| Visible Red | 3,000 mm | 2 m | Voltage: 0-10 V DC | **DF-G3-NU-2M** | **DF-G3-PU-2M** |
| | | | Current: 4-20 mA | **DF-G3-NI-2M** | **DF-G3-PI-2M** |
| Infrared, 850 nm | 6,000 mm | 2 m | Voltage: 0-10 V DC | **DF-G3IR-NU-2M** | **DF-G3IR-PU-2M** |
| | | | Current: 4-20 mA | **DF-G3IR-NI-2M** | **DF-G3IR-PI-2M** |

* Only 2 m (6.5 ft) PVC cable models are listed. To order M8 Pico pigtail, change suffix "**2M**" to "**Q3**" (for example, **DF-G3-NU-Q3**). To order M12 Euro pigtail, change suffix "**2M**" to "**Q5**" (for example, **DF-G3-NU-Q5**).

# DF-G3 Series

## Water Detection Fiber Optic Amplifiers

- 1450 nm infrared wavelength to enhance contrast of clear liquids
- Reliable detection of presence or absence of water-based liquids
- Easy to read dual digital displays show both signal level and threshold simultaneously
- Cross-talk avoidance function allows seven inspections in dense sensing point applications
- Models with IO-Link enable a point-to-point communication link between a master device and a sensor, facilitating remote monitoring, teaching, and configuration
- Applications see page 30

### Single Output

⇨ Infrared LED

| Sensing Beam Color | Range | Connection | NPN Models | PNP Models |
|---|---|---|---|---|
| Long Infrared, 1450 nm | 900 mm | 2 m | **DF-G3LIR-NS-2M** | **DF-G3LIR-PS-2M** |

### Dual Output

⇨ Infrared LED

| Sensing Beam Color | Range | Connection | NPN Models | PNP Models |
|---|---|---|---|---|
| Long Infrared, 1450 nm | 900 mm | 2 m | **DF-G3LIR-ND-2M** | **DF-G3LIR-PD-2M** |

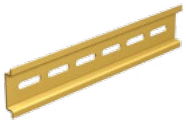
### Analog

⇨ Infrared LED

| Sensing Beam Color | Range | Connection | Analog Output | NPN Models | PNP Models |
|---|---|---|---|---|---|
| Long Infrared, 1450 nm | 900 mm | 2 m | Voltage: 0-10 V DC | **DF-G3LIR-NU-2M** | **DF-G3LIR-PU-2M** |
| | | | Current: 4-20 mA | **DF-G3LIR-NI-2M** | **DF-G3LIR-PI-2M** |

* Only 2 m (6.5 ft) PVC cable models are listed. To order M8 Pico pigtail, change suffix "**2M**" to "**Q3**" (for example, **DF-G3-LIR-Q3**). To order M12 Euro pigtail, change suffix "**2M**" to "**Q5**" (for example, **DF-G3-LIR-Q5**).

Additional DF-G1, DF-G2, and DF-G3 models are available at bannerengineering.com



DIN-35..

SA-DIN-BRACKET

**SA-DIN-CLAMP**
Mounting Clamp

4-pin Euro QD

**MQDC-415**
5 m (15')
**MQDC-415RA**
5 m (15')

**4- pin Pico QD**
Straight snap-on connector

Right-angle snap-on connector

**PKG4-2**
2 m (6')

**PKW4Z-2**
2 m (6')

Additional lengths available on bannerengineering.com

## Specifications

| | |
|---|---|
| **Supply Voltage and Current** | NPN/PNP Models: 10 to 30 V dc (10% max ripple)<br>Voltage output models: 12 to 30 V dc (10% max ripple)<br>Standard Mode: 960 mW, Current consumption < 40 mA @ 24 V dc<br>IO-Link Models: 18 to 30 V dc (10% max ripple)<br>Current output models: 10 to 30 V dc (10% max ripple)<br>ECO Display Mode: 720 mW, Current consumption < 30 mA @ 24 V dc |
| **Sensing Beam** | DF-G3: Visible red, 635 nm DF-G3IR: Infrared, 850 nm DF-G3LIR: Long Infrared, 1450 nm |
| **Supply Protection Circuitry** | Protected against reverse polarity, over voltage, and transient voltages |
| **Output Configuration** | NPN/PNP Models: 1 current sourcing (PNP) or 1 current sinking (NPN) output, depending on model<br>IO-Link Models: 1 push-pull and 1 PNP (complementary outputs)<br>Voltage output models: 1 analog voltage output (user configurable as 1 V to 5 V or 0 V to 10 V) with 1 current sinking (NPN) or 1 current sourcing (PNP) discrete output<br>Current output models: 1 analog current output (4 mA to 20 mA) with 1 current sinking (NPN) or 1 current sourcing (PNP) discrete output |
| **Output Rating** | 100 mA max. load (derate 1 mA per °C above 30 °C)<br>OFF-state leakage current: NPN/PNP/current: < 5 µA at 30 V dc<br>IO-Link: < 50 µA at 30 V dc<br>ON-state saturation voltage: NPN: < 1.5 V<br>PNP: < 2 V<br>IO-Link: < 2 V |
| **Output Protection Circuitry** | Protected against output short-circuit, continuous overload, transient over-voltages, and false pulse on power up |
| **Output Response Time** | High Speed: 500 us Fast: 1000 us<br>Standard: 2 ms Long Range: 8 ms<br>Extra Long Range: 24 ms |
| **Delay at Power-up** | 500 milliseconds max.; outputs do not conduct during this time |
| **Indicators** | Red 4-digit Display: Signal Level Green 4-digit Display: Threshold Yellow LED: Output conducting<br>(In Program Mode, Red and Green displays are used for programming menus) |
| **Construction** | Black ABS/polycarbonate alloy (UL94 V-0 rated) housing, clear polycarbonate cover |
| **Environmental Rating** | IEC IP50, NEMA 1 |
| **Operating Conditions** | Temperature: –10 to +55 °C Storage: –20 to +85 °C Relative Humidity: 50% @ +50 °C (non-condensing) |
| **Certifications** | CE c UL us LISTED 3TJJ IND. CONT. EQ. IO-Link® |

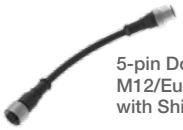
# K50U Series

## Ultrasonic Sensor for Wireless Level and Tank Monitoring

- Three meter sensing range with a 300 mm dead zone
- Provides a distance measurement from the target to the sensor
- Built-in temperature compensation
- Rugged design for demanding sensing environments; rated IEC IP67, NEMA 6P
- Functions as a Modbus slave device using RS-485
- Applications see page 36

| Range and Frequency | Supply Voltage | I/O | Models |
|---|---|---|---|
| Range: 300 mm to 3 m<br>Frequency: 114 kHz | 3.6 to 5.5 V dc | Distance to target using a 1-wire serial interface | **K50UX1RA** |
| Range: 300 mm to 3 m<br>Frequency: 114 kHz | 3.6 to 5.5 V dc or<br>10 to 30 V dc | Distance to target using Modbus RS-485 | **K50UX2RA** |

**BWA-BK-006**
Mounts both the K50U Ultrasonic sensor and a Wireless Q45 Node



**5-pin Double Ended M12/Euro-Style with Shield**

**DEE2R-53D**
1 m (3')

Additional lengths available on bannerengineering.com

## Specifications

| | |
|---|---|
| Supply Voltage and Current | 3.6 to 5.5 V dc or 10 to 30 V dc |
| Current | Active comms: 11.3 mA at 30 V dc |
| Indicators | Two LEDs |
| Construction | Housing: PBT polyester  Transducer: Epoxy/ceramic composite |
| Sensing Range | Sensing range: 300 mm to 3 m (11.8 in to 118 in) |
| Resolution | Resolution: 0.1% of distance (1.5 mm minimum) |
| Sensor Connection | 1 ¼ in NPT Connection |
| Cable Connection | Integral 5-pin M12/Euro-style male quick disconnect (QD) |
| Environmental Rating | Leakproof design, rated IEC IP67 (NEMA 6) |
| Certifications | CE |

# QT50U Series

## Long-Range Ultrasonic Sensors

- Features a small ultrasonic dead zone of 200 mm
- Available in a chemically resistant model with a Teflon® flange
- Detects targets at long ranges within confined areas, such as a storage tank, without interference from the tank walls
- Push-button and remote TEACH-mode programming with an external switch, computer or controller for added security and convenience
- Applications see page 10

### 10-30 V DC

| Range | Connection | Output | Models* |
|---|---|---|---|
| 200 mm to 8 m | 2 m<br>5-pin Mini QD<br>5-pin Euro QD | Selectable<br>0 to 10 V dc or 4 to 20 mA | **QT50ULB**<br>**QT50ULBQ**<br>**QT50ULBQ6** |
| 200 mm to 8 m | 2 m<br>5-pin Mini QD<br>5-pin Euro QD | Selectable<br>Dual NPN or PNP | **QT50UDB**<br>**QT50UDBQ**<br>**QT50UDBQ6** |

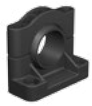
### Universal Voltage, 85-264 V AC/48-250 V DC

| Range | Connection | Output Operation Mode | Output | Models* |
|---|---|---|---|---|
| 200 mm to 8 m | 2 m<br>5-pin Micro QD<br>5-pin Mini QD | Window-limit<br>(complementary outputs) | SPDT<br>e/m relay | **QT50UVR3W**<br>**QT50UVR3WQ1**<br>**QT50UVR3WQ** |
| 200 mm to 8 m | 2 m<br>5-pin Micro QD<br>5-pin Mini QD | Pump/level control<br>(pump-in and pump-out logic) | SPDT<br>e/m relay | **QT50UVR3F**<br>**QT50UVR3FQ1**<br>**QT50UVR3FQ** |

Add suffix **-CRFV** to model number for Teflon®-protected face and transducer

**SMB30A**

**SMB30MM**



**SMB30SC**

**5-pin Euro-Style**

**MQDEC2-515**
**MQDEC2-515RA**
5 m (15')

**5-Pin Micro-Style**

**MQVR3S-515**
**MQVR3S-515RA**
5 m (15')

**5-Pin Mini-Style**

**MBCC2-512**
4 m (12')

Additional lengths available on bannerengineering.com

## Specifications

| | |
|---|---|
| **Supply Voltage and Current** | Analog models: 10 to 30 V dc (10% max. ripple); 100 mA max @ 10 V, 40 mA max. @ 30 V (exclusive of load)<br>Dual-discrete models: 10 to 30 V dc (10% max. ripple); 100 mA max. @ 10 V, 40 mA @ 30 V (exclusive of load) |
| **Output Configuration** | Analog models: Voltage sourcing: 0 to 10 V dc Current sourcing: 4 to 20 mA<br>Dual-discrete models: Dual PNP or NPN, selectable using DIP switch |
| **Linearity (Analog Models)** | +/- 0.2% of span from 200 to 8000 mm; +/- 0.1% of span from 500 to 8000 mm (1 mm minimum) |
| **Resolution/Repeatability** | 1.0 mm |
| **Output Response Time** | Analog models: 100 to 2300 milliseconds<br>Dual-discrete models: 100 to 1600 milliseconds |
| **Construction** | Transducer: Ceramic/Epoxy composite<br>Membrane Switch: Polyester<br>Housing: ABS/Polycarbonate<br>Lightpipes: Acrylic |
| **Environmental Rating** | IEC IP67; NEMA 6P |
| **Operating Conditions** | Temperature: -20 to +70 °C Relative humidity: 100% |
| **Certifications** | CE |

# DXM Wireless Controller

## Industrial Wireless Controller

- ISM radios available in 900 MHz and 2.4 GHz for local wireless network
- Converts Modbus RTU to Modbus TCP/IP or Ethernet I/P
- Logic controller can be programmed using action rules and text language methods
- Cellular connectivity
- Micro SD card for data logging
- Email and text alerts
- Local I/O options: universal inputs, NMOS outputs, and analog outputs
- Powered by 12 to 30 V dc, 12 V dc solar panel, or battery backup
- RS-232, RS-485, and Ethernet communications ports; and a USB configuration port
- LCD display for I/O information and user programmable LED's
- Applications see page 37

| Description | Frequency | Models* |
|---|---|---|
| DXM100 Controller, with DX80 Gateway, preconfigured as a protocol converter | 900 MHz | **DXM100-B1R1** |
| DXM100 Controller, with DX80 Gateway, preconfigured as a protocol converter | 2.4 GHz | **DXM100-B1R3** |
| DXM100 Controller with MultiHop Data Radio | 900 MHz | **DXM100-B1R2** |
| DXM100 Controller with MultiHop Data Radio | 2.4 GHz | **DXM100-B1R4** |
| DXM100 Controller with DX80 Gateway and CDMA cellular module, preconfigured as a protocol converter | 900 MHz | **DXM100-B1C1R1** |
| DXM100 Controller with DX80 Gateway and CDMA cellular module, preconfigured as a protocol converter | 2.4 GHz | **DXM100-B1C1R2** |

* Additional local I/O available with the DXM150 models, contact Banner for more information

**PSDINP-24-13**
DIN Rail mount power supply

**PSD-24-4**
Desktop style power supply

4-pin Male Euro-Style

**MQDMC-401**

## Specifications

| | |
|---|---|
| **Supply Voltage** | 12 to 30 V dc or 12 V dc solar panel and 12 V sealed lead acid battery |
| **Power Consumption** | 35 mA average at 12 V |
| **Solar Power Battery Charging** | 1 Amp maximum with 20 Watt solar panel |
| **Radio Range** | 900 MHz, 1 Watt: Up to 9.6 km (6 miles) 2.4 GHz, 65 mW: Up to 3.2 km (2 miles) |
| **Logging** | 8 GB maximum; removable Micro SD card format |
| **Protocols** | Modbus RTU Master/Slave, Modbus TCP, and Ethernet/IP |
| **Construction** | Polycarbonate; DIN rail mount option |
| **Environmental Rating** | IP20 |
| **Courtesy Power** | One; output at 5 volts , 500 mA maximum |
| **Switched Power Outputs** | 5 V/400 mA maximum; 16 V/125 mA maximum |
| **Analog Outputs** | 0 to 20 mA or 0 to 10 V dc output<br>Accuracy: 0.1% of full scale +0.01% per °C<br>Resolution: 12 bit |
| **NMOS Outputs** | Less than 1 A max current at 30 V dc<br>ON-state saturation: less than 0.7 V at 20 mA<br>ON condition: Less than 0.7 V<br>Off condition: Open |
| **Certifications** | CE |

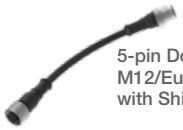

# QM42 Series

## Vibration and Humidity Sensors

- Provides high accuracy vibration (velocity RMS) and temperature measurements
- Manufactured with a robust zinc alloy housing
- Connects via a 1-wire serial interface
- Reduces labor costs by obviating manual checks and eliminating error
- Applications see page 36

| I/O | Power | Connection | Models |
|---|---|---|---|
| 1-Wire Serial | 3.6 to 5.5 V dc | 3 m | **QM42VT1** |
| RS-485 Modbus | 3.6 to 5.5 V dc low power option or 10 to 24 V dc | 3 m | **QM42VT2** |

**BWA-BK-002** **BWA-BK-001**



**5-pin Double Ended M12/Euro-Style with Shield** | **DEE2R-53D** 1 m (3')

Additional lengths available on bannerengineering.com

**RS-485 to USB Adaptor**
Used with QM42VT2 to talk to GUI | **BWA-HW-006**

**1-Wire Serial to USB Adaptor**
Protocol converter used with QM42VT1 to talk to GUI | **BWA-USB1WIRE-001**

## Specifications

| | | |
|---|---|---|
| **Supply Voltage and Current** | 3.6 to 5.5 V dc or 10 to 24 V dc | |
| **Vibration** | Mounted base resonance: 5.5 kHz nominal<br>Measuring range: 0-46 mm/sec or 0–1.8 in/sec RMS | Frequency Range: 10 – 1000 Hz<br>Accuracy: ± 10% @25 °C |
| **Temperature** | Measuring range: -40 to +105 °C (-40 to +221 °F) | Resolution: 0.1 °C Accuracy: ±3 °C |
| **Construction** | Housing: Zinc alloy | |
| **Shock** | 400G | |
| **Environmental Rating** | IEC IP67; NEMA 6 | |
| **Operating Conditions** | Temperature: –40 to +105 °C | |
| **Certifications** | CE | |

# M12F Series

## Temperature and Humidity Sensors

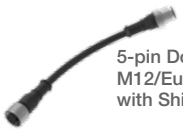
- Manufactured with a robust metal housing
- Designed to work as a Modbus slave device via RS-485 or with Sure Cross® 1-wire serial interface -P6 nodes, -H6 MultiHop Radios, or Q45 Sensor Node DX80N2Q45TH
- Ships with aluminum grill filter cap; optional stainless steel 10 micrometer sintered filter available separately
- Applications see page 36

### Temperature and Humidity

| I/O | Power | Connection | Models |
|---|---|---|---|
| RS-485 Modbus | 3.6 to 5.5 V dc low power option or 12 to 24 V dc | 5-pin Euro QD | **M12FTH3Q** |
| 1-wire serial interface | 3.6 to 5.5 V dc | | **M12FTH4Q** |

### Temperature

| I/O | Power | Connection | Models |
|---|---|---|---|
| RS-485 Modbus | 3.6 to 5.5 V dc low power option or 12 to 24 V dc | 5-pin Euro QD | **M12FT3Q** |
| 1-wire serial interface | 3.6 to 5.5 V dc | | **M12FT4Q** |



**5-pin Double Ended M12/Euro-Style with Shield**

**DEE2R-53D**
1 m (3')

Additional lengths available on bannerengineering.com

**FTH-FIL-001**
Aluminum Grill Filter Cap

**FTH-FIL-002**
Stainless Steel Filter Cap

## M12F Specifications

| | |
|---|---|
| **Supply Voltage and Current** | 3.6 to 5.5 V dc low power option or 12 to 24 V dc |
| **Resolution** | Humidity: 0.1% relative humidity<br>Temperature: 0.1 °C |
| **Construction** | Housing: metal |
| **Environmental Rating** | IEC IP67; NEMA 6 |
| **Operating Conditions** | Temperature: –40 °C to +85 °C |
| **Certifications** | C US CSA: Class I, Division 2, Groups A, B, C, D — Certificate 1921239 |

# EZ-SCREEN® LS

## Rugged Safety Light Screen with Enhanced Features

- Alignment indicators are highly visible and intuitive diagnostics simplify setup, facilitate troubleshooting and streamline installation
- No blind zone design provides end-to-end sensing to eliminate gaps in detection
- Metal end caps, thick aluminum housing and a recessed window to avoid damage from impact
- Standard pairs, cascade systems and extensive accessories to suit a wide variety of safeguarding configurations
- Applications see page 13, 21, 27, 33

### Hygienic

| Family | System Type | Resolution | | Defined Area | Connector |
|---|---|---|---|---|---|
| **EZLSA-HTE** | **R** | **23** | – | **770** | |

**System Type**
- **E** = Emitter only
- **R** = Receiver only

**Resolution**
- **23** = 23 mm

**Defined Area**
- **280** = 280 mm
- **350** = 350 mm
- **420** = 420 mm
- **490** = 490 mm
- **560** = 560 mm
- **630** = 630 mm
- **700** = 700 mm
- **770** = 770 mm
- **840** = 840 mm
- **910** = 910 mm
- **980** = 980 mm
- **1050** = 1050 mm

**Connector**
- **Blank** = 25 ft., 8-wire, high durometer PVC Cordset
- **F** = Remote Fixed Blanking model with additional 25 ft. cordset for blanking configuration

### Standard

| Family | System Type | Resolution | | Defined Area | Connector* |
|---|---|---|---|---|---|
| **SLL** | **P** | **14** | – | **770** | **P88** |

**System Type**
- **E** = Emitter only
- **R** = Receiver only
- **P** = Pair (Emitter and Receiver)

**Resolution**
- **14** = 14 mm
- **23** = 23 mm
- **40** = 40 mm

**Defined Area**
- **280** = 280 mm
- **350** = 350 mm
- **420** = 420 mm
- **490** = 490 mm
- **560** = 560 mm
- **630** = 630 mm
- **700** = 700 mm
- **770** = 770 mm
- **840** = 840 mm
- **910** = 910 mm
- **980** = 980 mm
- **1050** = 1050 mm
- **1120** = 1120 mm
- **1190** = 1190 mm
- **1260** = 1260 mm
- **1330** = 1330 mm
- **1400** = 1400 mm
- **1470** = 1470 mm
- **1540** = 1540 mm
- **1610** = 1610 mm
- **1680** = 1680 mm
- **1750** = 1750 mm
- **1820** = 1820 mm

**Connector***
- **P8** = 300 mm pigtail, 8-Pin M12 QD (individual Emitter or Receiver models)
- **P88** = 300 mm pigtail, 8-Pin M12 QD (on BOTH Emitter and Receiver models)
- **Blank** = no pigtail, RD connection (for RDLS-8..D cordset)

* 5-pin M12 QD options available (P5 or P55)

### Cascadable

| Family | Cascadable | System Type | Resolution | | Defined Area | Connector* |
|---|---|---|---|---|---|---|
| **SLL** | **C** | **P** | **14** | – | **770** | **P88** |

**Cascadable**
- **C** = Cascadable

**System Type**
- **E** = Emitter only
- **R** = Receiver only
- **P** = Pair (Emitter and Receiver)

**Resolution**
- **14** = 14 mm
- **23** = 23 mm
- **40** = 40 mm

**Defined Area**
- **280** = 280 mm
- **350** = 350 mm
- **420** = 420 mm
- **490** = 490 mm
- **560** = 560 mm
- **630** = 630 mm
- **700** = 700 mm
- **770** = 770 mm
- **840** = 840 mm
- **910** = 910 mm
- **980** = 980 mm
- **1050** = 1050 mm
- **1120** = 1120 mm
- **1190** = 1190 mm
- **1260** = 1260 mm
- **1330** = 1330 mm
- **1400** = 1400 mm
- **1470** = 1470 mm
- **1540** = 1540 mm
- **1610** = 1610 mm
- **1680** = 1680 mm
- **1750** = 1750 mm
- **1820** = 1820 mm

**Connector***
- **P8** = 300 mm pigtail, 8-Pin M12 QD (individual Emitter or Receiver models)
- **P88** = 300 mm pigtail, 8-Pin M12 QD (on BOTH Emitter and Receiver models)
- **Blank** = no pigtail, RD connection (for RDLS-8..D cordset)

* 5-pin M12 QD options available (P5 or P55)

## Machine Interface Connections

**8-PIN RD Cordsets**

**RDLS-815**
4.6 m (15')

**8-pin M12 Euro-Style**

**QDE-850D**
15.3 m (50')

Additional lengths available on bannerengineering.com

**8-pin Euro-Style Straight splitter**

**CSB-M1280M1280**
**CSB-M1281M1281**
**CSB-M12815M1281**

**8-pin Euro-Style double-ended male/female**

**DEE2R-815D**
4.5 m (15')
**DEE2R-850D**
15.3 m (50')

Additional lengths available on bannerengineering.com

## Cascading Connections

**Double-ended RD to RD**

**DELS-118E**
2.5 m (8.2')
**DELS-1115E**
4.6 m (15')

Additional lengths available on bannerengineering.com

**EZLSA-MBK-11**

**EZLSA-MBK-12**

**EZLSA-MBK-16**

**EZLSA-MBK-20**

**EZLSA-K30LGR**
Connects directly to
**SLLCR...** cascade receiver

**K30LGRXPQ**
requires 4-pin QD

**K50LGRXPQ**
requires 4-pin QD

**TL50GRQ**
requires 4-pin QD

**RD to Euro-Style**
Connects indicators to a cascade receiver

**DELSEF-41D**
0.3 m (1')
**DELSEF-48D**
2.5 m (8.2')

Additional lengths available on bannerengineering.com

## Specifications

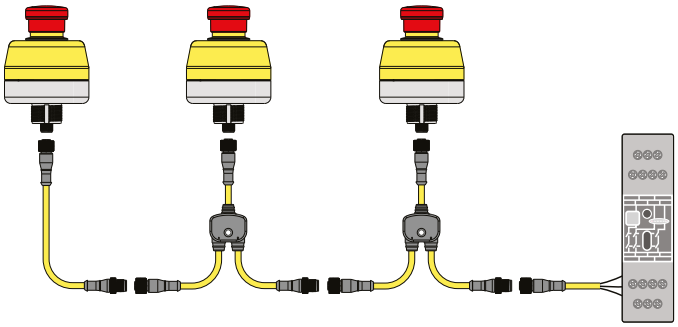
| | |
|---|---|
| **Supply Voltage at the Device** | 24 V dc ±15% (use a SELV-rated power supply according to EN IEC 60950).The external voltage supply must be capable of buffering brief mains interruptions of 20 ms, as specified in IEC/EN 60204-1. |
| **Short Circuit Protection** | All inputs and outputs are protected from short circuits to +24 V dc or dc common |
| **Effective Aperture Angle (EAA)** | Meets Type 4 requirements per IEC 61496-2 |
| **Residual Ripple** | ±10% maximum |
| **Electrical Safety Class** | III (per IEC 61140: 1997) |
| **Operating Range** | 0.1 m to 12 m (4 in to 39 ft) — Range decreases with use of mirrors and/or lens shields:<br>• Lens shields — approx 10% less range per shield<br>• Glass-surface mirrors — approx 8% less range per mirror<br>See the specific mirror datasheet for more information |
| **Resolution** | 14 mm, 23 mm, or 40 mm, depending on model |
| **Mounting Hardware** | Emitter and receiver each are supplied with a pair of swivel end-mounting brackets (EZLSA-MBK-11).<br>Models 980 mm and longer are supplied with an additional center-mount bracket (EZLSA-MBK-12) for center support in applications with significant vibration.<br>Mounting brackets are 8-gauge cold-rolled steel, black zinc finish. |
| **Enclosure** | Extruded aluminum housing with yellow polyester powder finish<br>standard and well-sealed, rugged die-cast zinc end caps, acrylic lens cover |
| **Safety Rating** | Type 4 per IEC 61496-1, -2<br>Category 4 PL e per EN ISO13849-1<br>SIL3 per IEC 61508; SIL CL3 per IEC 62061 |
| **Environmental Rating** | Light Screen: IEC IP65/IEC IP67 Enclosure: IP69K |
| **Operating Conditions** | –20 to +55 °C (–4 to +131 °F) 95% maximum relative humidity (non-condensing) |
| **Shock and Vibration** | Components have passed vibration and shock tests according to IEC 61496-1. This includes vibration (10 cycles) of 10-55 Hz at 0.35 mm (0.014 in) single amplitude (0.70 mm peak-to-peak) and shock of 10 g for 16 milliseconds (6,000 cycles). |
| **Certifications** | CE cULus LISTED |


# E-Stop Button

## Illuminated 30 mm Mount

- Illumination allows for easy identification of which E-stop has been activated.
- Easy installation and no assembly or individual wiring required
- Push-to-stop, twist-to-release or pull-to-release operation per IEC 60947-5-5
- Compliant with ANSI B11.19, ANSI NFPA79 and IEC/EN 60204-1 Emergency Stop requirements
- Incorporate with OTB/STB optical touch button for a simplified operator station that does not require an additional enclosure.
- "Safe Break Action" ensures NC contacts will open if the contact block is damaged or separated from the actuator
- Models designed to interface with Safety BUS nodes/gateways
- Applications see page 13, 21, 27, 33

| Description | Illumination | Models |
|---|---|---|
| 2NC / 1NO (PNP) | YEL/RED-Flash/Solid | **SSA-EB1PLYR-12ECQ8** |
| 2NC / 1NO (PNP) | GREEN/RED-Flash/Solid | **SSA-EB1PLGR-12ECQ8** |
| 2NC / 1NO (PNP) | OFF/RED-Flash/Solid | **SSA-EB1PLXR-12ECQ8** |
| 2NC / 1NO (PNP) | OFF/RED-Flash/Solid, with 60 mm button | **SSA-EB2PLXR-12ECQ8** |
| 2NC / 1NO (PNP) | OFF/RED-Solid/Solid | **SSA-EB1PL-12ECQ8** |
| 2NC – Safety BUS node compatible | YEL/RED-Flash | **SSA-EB1PLYR-02ECQ5A** |
| 2NC – Safety BUS node compatible | OFF/RED-Flash | **SSA-EB1PLXR-02ECQ5A** |
| 2NC – Safety BUS node compatible | OFF/RED-Soild | **SSA-EB1PL-02ECQ5A** |
| 2NC – Safety BUS node compatible | Illuminated button, OFF (armed), RED (solid, PUSH ON) | **SSA-EB1PL2-02ECQ5A** |
| 2NC – Safety BUS node compatible | YEL/RED-Flash | **SSA-EB1PLYR-02ECQ5B** |
| 2NC – Safety BUS node compatible | OFF/RED-Flash | **SSA-EB1PLXR-02ECQ5B** |
| 2NC – Safety BUS node compatible | OFF/RED-Solid | **SSA-EB1PL-02ECQ5B** |
| 2NC – Safety BUS node compatible | Illuminated button, OFF (armed) RED (solid, PUSH ON) | **SSA-EB1PL2-02ECQ5B** |



**SSA-MBK-EEC1**

**SSA-MBK-EEC2**

**SSA-MBK-EEC3**

**SSA-EB1P-ECWC**
Washdown cover

(A)
Euro-Style
Straight
splitter

4-Pin
**CSS-M12F43M12M41M12F41**
0.9 m (3')

8-Pin
**CSS-M12F83M12M81M12F81**
0.9 m (3')

(B)
Euro-Style
Double-ended
male/female

5-Pin
**DEE2R-53D**
0.9 m (3')

8-Pin
**DEE2R-83D**
0.9 m (3')

(C)
M12/Euro-Style

4-Pin
**MQDC-415**
5 m (15')
**MQDC-415RA**
5 m (15')

8-Pin
**MQDC2S-815**
5 m (15')
**MQDC2S-815RA**
5 m (15')

Additional lengths available on bannerengineering.com

## 30 mm E-Stop Push Button Specifications

| | |
|---|---|
| **Housing / Button Mounting** | Polycarbonate / Polyamide<br>Threaded base has M30 x 1.5 external threads.(M30 hardware included)<br>Max. Tightening Torque: 0.56 N·m (5 in·lbf) |
| **Operating Temperature** | –25 to +55 °C |
| **Environmental rating** | IP65 (IEC60529) |
| **Operating Humidity** | 45% to 85% RH (no condensation) |
| **Insulation Resistance** | 100M minimum (500 V dc megger) |
| **Impulse Withstand Voltage** | 2.5 kV |
| **Pollution Degree** | 3 |
| **Overvoltage Category** | II |
| **Contact material / bounce*** | Gold plated silver / 20 ms |
| **Electrical Life** | 100,000 operations minimum, 250,000 operations minimum at 24 V ac/dc, 100 mA |
| **Mechanical Life** | 250,000 operations |
| **B10d** | 100,000 (based on ISO13849-1(2006)) |
| **Shock & Vibration Resistance** | Operating extremes: 150m/s2 (15G) Operating extremes: 10 to 500 Hz, amplitude 0.35 mm acceleration 50 m/s2 |
| **LED Illumination** | Color: Yellow - 590 nm, Red - 618 nm, Green - 525 nm<br>Flash Rate: 1.6 Hz at 50% duty cycle<br>Voltage/Current: 12 – 30 V dc; 120 mA at 12 V dc, 65 mA at 24 Vdc, 60 mA at 30 V dc, SSA-EB1..LGR-..<br>GREEN only: 12 – 30 V dc; 135 mA @ 12 V dc, 75 mA @ 24 V dc, 70 mA @ 30 V dc |
| **Electrical Rating** | Minimum load: 1 mA @ 5 V ac/dc<br>SSA-EB1xx-..Q5A/Q5B: 3A @ 250 V maximum<br>UL Applications (UL/cUL): 1.5A @ 250 V ac, 1A @ 30 V dc (pilot duty)<br>SSA-EB1xx-xxED1Q8: 2A at 60 V ac/75 V dc maximum<br>CE Applications: AC-15: 1.5A @ 250 V ac, DC-13: 1A @ 30 V dc |
| **Rated Insulation Voltage (Ui)** | 250 V |
| **Rated Current (Ith)** | 3A |
| **Rated Operating Voltage (Ue)** | See Electrical Rating |
| **Rated Operating Current** | **SSA-EB1xxLxx-02ED1Q5A/Q5B** |

| | | | | | | |
|---|---|---|---|---|---|---|
| Safety Contact (NC) | AC 50/60 Hz | Resistive Load (AC-12) | — | — | — | 3A |
| | | Inductive Load (AC-15) | — | — | 3A | 1.5A |
| | DC | Resistive Load (DC-12) | 2A | — | 0.4A | 0.2A |
| | | Inductive Load (DC-13) | 1A | — | 0.22A | 0.1A |
| Monitor Contacts (NO) | AC 50/60 Hz | Resistive Load (AC-12) | — | — | 1.2A | 0.6A |
| | | Inductive Load (AC-15) | — | — | 0.6A | 0.3A |
| | DC | Resistive Load (DC-12) | 2A | — | 0.4A | 0.2A |
| | | Inductive Load (DC-13) | 1A | — | 0.22A | 0.1A |

**SSA-EB1PLxx-02ECQ5A/Q5B (illuminated)**

| | | | | | | |
|---|---|---|---|---|---|---|
| Safety Contact (NC) | AC 50/60 Hz | Resistive Load (AC-12) | — | — | — | 3A |
| | | Inductive Load (AC-15) | — | — | 3A | 1.5A |
| | DC | Resistive Load (DC-12) | 2A | — | 0.4A | 0.2A |
| | | Inductive Load (DC-13) | 1A | — | 0.22A | 0.1A |

**SSA-EB1Pxx-xxECQ8**
**See above for SSA-EB1P-22ECQ8 Monitor Contacts**

| | | | | | | |
|---|---|---|---|---|---|---|
| Safety Contact (NC) | AC 50/60 Hz | Resistive Load (AC-12) | — | 2A | — | — |
| | | Inductive Load (AC-15) | — | 2A | — | — |
| | DC | Resistive Load (DC-12) | 2A | 0.4A | — | — |
| | | Inductive Load (DC-13) | 1A | 0.22A | — | — |
| Auxiliary Output (NO) | 12 to 30 V dc (from pin 2) | Resistive Load (DC-12) | 0.25A | — | — | — |
| | | Inductive Load (DC-13) | 0.25A | — | — | — |

- The rated operating currents are measured at resistive/inductive load types specified in IEC 60947-5-1.
- See “Electrical Rating” above for maximum voltage/current rating per model.

| | |
|---|---|
| **Design Standards** | Compliant with EN/IEC 60497-1 / -5-1, ISO 13850, ANSI B11.19 , ANSI NFPA79, IEC 60204-1 |
| **Certifications** | CE c UL us LISTED |

# XS26-2

## Safety Controller

- Easy to both program and install while providing scalable flexibility to meet your growing automation needs.
- Allows up to eight expansion modules
- Configuration software free of charge
- Real-time live display feedback
- Intuitive functional diagram configuration; logic function blocks including AND, OR, XOR, NAND, NOR, SR Flip-flop, RS Flip-flop
- Ethernet models available providing up to 256 status outputs and non-safety virtual outputs
- Applications see page 13, 21, 27, 33

### Controller

| Description | Model |
|---|---|
| Expandable | **XS26-2** |
| Expandable + Display | **XS26-2d** |
| Expandable + Ethernet | **XS26-2e** |
| Expandable + Display + Ethernet | **XS26-2de** |

### Expansion Modules

| Description | Output Configuration | Model* |
|---|---|---|
| 8 Pin Safety input module | NA | **XS8si** |
| 16 Pin Safety input module | NA | **XS16si** |
| Safety output module | 2 dual channel PNP | **XS2so** |
| Solid-state safety output module | 4 dual channel PNP | **XS4so** |
| Safety relay output module | 2 NO/1NC | **XS1ro** |
| Safety relay output module | 4 NO/2 NC | **XS2ro** |

* All models come with screw terminals

**SC-XM2**
Memory Card

**SC-XMP2**
Programming Tool

**SC-USB2**
USB Cable

**SC-TC2**
Spring Terminal Block Set

## Specifications

| | |
|---|---|
| **Power** | 24 V dc, ± 20%<br>Ethernet models: add 40 mA<br>Display models: add 20 mA<br>Expandable models: add 3.6 A max. bus load |
| **Safety Inputs (and Convertible I/O when used as inputs)** | Input On threshold: > 15 V dc (guaranteed on), 30 V dc max.<br>Input Off threshold: < 5 V dc and < 2 mA, –3 V dc min.<br>Input On current: 5 mA typical at 24 V dc, 50 mA peak contact cleaning current at 24 V dc<br>Input lead resistance: 300 Ω max. (150 Ω per lead)<br>Input requirements for a 4-wire Safety Mat: • Max. capacity between plates: 0.22µF<br>• Max. capacity between bottom plate and ground: 0.22µF<br>• Max. resistance between the 2 input terminals of one plate: 20 Ω |
| **Solid State Safety Outputs** | Input On threshold: > 15 V dc (guaranteed on), 30 V dc max.<br>Input Off threshold: < 5 V dc and < 2 mA, –3 V dc min.<br>Input On current: 5 mA typical at 24 V dc, 50 mA peak contact cleaning current at 24 V dc<br>Input lead resistance: 300 Ω max. (150 Ω per lead)<br>Input requirements for a 4-wire Safety Mat: • Max. capacity between plates: 0.22 µF<br>• Max. capacity between bottom plate and ground: 0.22 µF<br>• Max. resistance between the 2 input terminals of one plate: 20 Ω |
| **Response and Recovery Times** | See Configuration Summary in the data sheet |
| **Environmental Rating** | NEMA 1 (IEC IP20), for use inside NEMA 3 (IEC IP54) or better enclosure |
| **Operating Conditions** | Temperature range: 0 to +55 °C |
| **Mechanical Stress** | Shock: 15g for 11 milliseconds, half sine, 18 shocks total (per IEC 61131-2)<br>Vibration: 3.5 mm occasional / 1.75 mm continuous @ 5Hz to 9Hz, 1.0g occasional and 0.5g continuous @ 9Hz to 150Hz: all at 10 sweep cycles per axis (per IEC 61131-2) |
| **Removable Terminals** | Important: Clamp terminals are designed for 1 wire only. If more than 1 wire is connected to a terminal, a wire could loosen or become completely disconnected from the terminal, causing a short.<br>Wire size: 24 to 12 AWG (0.20 to 3.13 mm²)<br>Wire strip length: 7 to 8 mm (0.275 in to 0.315 in) |
| **Design Standards** | Category 4, PL e (EN ISO 13849) SIL CL 3 (IEC 62061, IEC 61508) |
| **Certifications** | CE c UL us LISTED IND. CONT. EQ. 3NVF UL LISTED PROGRAMMABLE SAFETY CONTROLLER 3NBN |

# VE Series

## Versatile, Easy-To-Use Smart Cameras

- Available in 2MP (1600 x 1200 pixels), 1.3MP (1280 x 1024 pixels) and WVGA (752 x 480 pixels) models, all with the same powerful inspection capabilities
- Runtime editing capability reduces costly downtime and the software emulator allows for offline building and troubleshooting of applications
- Factory communications (EtherNet/IP, Modbus/TCP, PROFINET and RS-232 Serial) for integration on the manufacturing floor
- Two-line, eight-character onboard display provides inspection information and focus number and makes it easy to update sensor settings, facilitating fast product changeover
- Robust metal housing with optional lens covers to achieve IP67 rating for use in harsh environments with heat, vibration, or moisture
- Applications see page 32

| Family | Resolution | Imager | Ethernet Connection |
|---|---|---|---|
| VE | 202 | G | 1A |
| | **200** = WVGA, 752 x 480 pixels<br>**201** = 1.3 MP, 1280 x 1024 pixels<br>**202** = 2MP, 1600 x 1200 pixels | **G** = Grayscale | **1A** = M12, 8-pin Euro-style female |


C-Mount lenses, lens covers, and bandwidth filters are available on bannerengineering.com

**SMBVERA**

**SMBVEMP**
Mounting plate with M8x1.25, 10-32, and 1/2-20 adapter holes

**12-pin Euro-Style with Shield**
**MQDC2S-1215**
**MQDC2S-1215RA**
5 m (15')

**RJ45 to Ethernet 8-pin M12 Euro (Cat5e shielded)**
**STP-M12-815**
5 m (15')

Additional lengths available on bannerengineering.com

## Specifications

| | |
|---|---|
| **Power** | 12 to 30 V dc |
| **Discrete I/O** | 1 Trigger IN 5 programmable I/O |
| **Output Configuration** | Optically isolated |
| **Lens** | C-mount |
| **Communication** | 10/100/1000 Mbps Ethernet, Serial RS-232 |
| **Communication Protocols** | Ethernet/IP, Modbus/TCP, PCCC, PROFINET, TCP/IP, FTP, and RS-232 |
| **Acquisition** | 256 grayscale levels<br>Frames per Second: VE202G1A: 50 fps, max. depending on inspection settings<br>VE202G2A: 50 fps,<br>VE200G1A: 60 fps,<br>VE201G1A: 60 fps<br>Image Size: 752 x 480 pixels = VE200G1A<br>1280 x 1024 pixels = VE201G1A<br>1600 x 1200 pixels = VE202G1A, VE202G2A |
| **Construction** | Housing: Aluminum Display Label: Polyester |
| **Connections** | Communications: M12, 8-pin Euro-style male<br>Light Connector: M8, 3-pin Pico-style female<br>Power, Discrete I/O: M12, 12-pin Euro-style female |
| **Software Tools** | Average Gray, Bead, Blemish, Blob, Line Detect, Circle Detect, Edge, Locate, Logic, Match, Math, Measure, Object |
| **Environmental Rating** | IEC IP67 with optional lens cover |
| **Certifications** | CE cULus LISTED |

# iVu TG Plus Gen2

## Image Sensor

- Image sensor combines the simplicity of a photoelectric sensor and the intelligence of a vision sensor, providing high-performance inspection capabilities at your fingertips
- All-inclusive image sensor with lens, light, IO and touch screen programming
- Optional remote touch screen for programming
- Profinet® communication protocol to simplify communications with some of the most commonly used industrial controllers in factory automation
- Supports the ability to obtain results and command rapid product changeovers over TCP/IP, EtherNet/IP, Modbus/TCP protocols or PROFINET
- Ability to change parameters on the fly
- Additional sort tools, multi-tool and the ability to store up to 30 inspections
- Applications see page 26, 31

| Family† | Touch Screen | Ring Light Color | Lens (mm) |
|---|---|---|---|
| **IVU2P** | **TG** | **R** | **04** |
| **IVU2P** = Match, Area, Blemish, Sort and Multi-tool with Ethernet and storage for 30 inspections | **TG** = Integrated<br>**RG** = Remote* | **R** = Red<br>**B** = Blue<br>**G** = Green<br>**W** = White<br>**I** = Infrared<br>**6** = UV365<br>**9** = UV395<br>**XC** = C-mount**<br>**X** = No Ring Light | **04** = 4.3<br>**06** = 6<br>**08** = 8<br>**12** = 12<br>**16** = 16<br>**25** = 25<br>**Blank** = No lens (only C-Mount) |

* Remote display is required for set up and viewing of sensors with a remote touch screen

** Requires C-mount lens

RDM35 Remote Touch Screen (sold separately)


Sensors with Remote Touch Screen

**SMBIVURAL**

**SMBIVURAR**

**SMBIVUU**

**SMBIVUB**
TG model only

**SMBRD35**

**SMBKS**

**SMBRDM35**

Used with: Remote Display Screens

**Power**

**M12/Euro-Style with Shield**

**12-Pin**

**MQDC2S-1215**
5 m (15')
**MQDC2S-1215RA**
5 m (15')


4-Pin Pico

**PSG-4M-403-USB**
0.9 m (3')

**Ethernet**

**RJ45 to 4-Pin Pico QD**
TG Plus only

**IVUC-E-415**
5 m (15')

Additional lengths available on |bannerengineering.com

## iVu & iVu Plus Specifications

| General | |
|---|---|
| **Supply Voltage** | 10-30 V dc |
| **Demo Mode** | Full tool functionality on canned images |
| **Sensor Lock** | Optional password protection |
| **Integrated Ring Light** | Red, IR, Green, Blue, White, UV or no integrated ring light |
| **Imager** | 1/3 inch CMOS 752 x 480 pixels; adjustable Field-of-View (FOV) |
| **Lens Mount** | M12 X 1 mm thread (c-mount lens); microvideo lens 4.3, 6, 8, 12, 16, 25 mm |
| **Output Rating** | 150 mA |
| **Exposure Time** | 0.1 milliseconds to 1.049 seconds |
| **Construction** | Black Valox™ sensor housing; acrylic window iVu Plus Integrated: Die cast zinc and Black Valox™ |
| **External Strobe Output** | + 5 V dc |
| **Environmental Rating** | IP67 |
| **Model Specific** | |
| **Power Connection** | Integrated and remote touch screen: 12-pin Euro-style (M12) male connector<br>Accessory cordset required for operation; QD cordsets are ordered separately. |
| **Supply Current** | 850 mA max. (exclusive of I/O load) |
| **USB 2.0 Host** | Integrated and remote touch screen: 4-pin Pico-style (M8) female connector<br>Optional USB cordset required for operation of USB Thumb Drive. QD cordsets are ordered separately. |
| **Ethernet Connection** | iVu Plus TG: 4-pin Pico-style (M8) male connector. Ethernet cordsets are ordered separately. |
| **Output Configuration** | NPN or PNP, software on-screen selectable |
| **Tools** | Area, Blemish, Match and Sort |
| **Display** | Integrated touch screen: 68.5 mm (2.7") LCD Color Integrated Display 320 x 240 pixels<br>Remote touch screen: See RD35 Remote Display specifications |
| **Acquisition** | 100 fps (frames per second) max. |
| **Operating Conditions** | Stable Ambient Temperature:<br>Integrated touch screen: 0 to +45 °C Remote touch screen: 0 to +40 °C |
| **Remote Display Connection** (Remote Touch Screen Models Only) | 8-pin Euro-style (M12) female connector. Accessory cordset required for remote display; QD cordsets are ordered separately. |
| **Certifications** | CE NOTE: iVu Plus remote must use Euro QD power cordset for CE compliance. c UL us LISTED |

## iVu Remote Display Specifications

| | | | |
|---|---|---|---|
| **Screen Size** | 3.5" diagonal | **Stylus** | Delrin |
| **LCD Aspect Ratio** | 4:3 | **Display Weight** | 4.8 oz (RD35), 12 oz (RDM35) |
| **Display Resolution** | 320 x 240 RGB | **Bracket & Stylus Weight** | 1.1 oz |
| **Viewing Angle** | 60 degrees left, and 60 degrees right, 50 degrees up, and 55 degrees down | **Connection** | Molex HandyLink connector |
| **Housing Material** | Zinc Zamac #3 (RDM35), Polycarbonate (RD35) | **Operating Temperature** | 0° to + 40 °C |
| **Bracket Material** | Delrin (RD35), ABS (RDM35) | | |

# iVu Plus BCR Gen2

## Bar Code Reader (BCR)

- Powerful, affordable inspection solution solves a wide variety of simple and complex applications
- Solve a variety of linear and 2D bar code applications
- First-time users can have it up and running in minutes
- Optional remote touch screen for programming
- Ability to change parameters on the fly
- Ethernet communication available
- Capable of storing and controlling up to 30 inspections for fast product change over
- Applications see page 11, 18, 31

| Family | Touch Screen | Ring Light Color | | Lens (mm) | |
|---|---|---|---|---|---|
| IVU2P | RB | R | | 04 | |
| **IVU2P** = Reads 1D and 2D with Ethernet and storage for 30 inspections | **TB** = Integrated<br>**RB** = Remote | **R** = Red<br>**B** = Blue<br>**G** = Green<br>**W** = White<br>**I** = Infrared | **6** = UV365<br>**9** = UV395<br>**XC** = C-mount*<br>**X** = No Ring Light | **04** = 4.3<br>**06** = 6<br>**08** = 8<br>**12** = 12 | **16** = 16<br>**25** = 25<br>**Blank** = No lens (only C-Mount) |

* Requires C-mount lens

Accessories are shown on previous page.

## Specifications

| | |
|---|---|
| **General** | |
| **Supply Voltage** | 10-30 V dc |
| **Demo Mode** | Full tool functionality on canned images |
| **Sensor Lock** | Optional password protection |
| **Integrated Ring Light** | Red, IR, Green, Blue, White, UV or no integrated ring light |
| **Imager** | 1/3 inch CMOS 752 x 480 pixels; adjustable Field-of-View (FOV) |
| **Lens Mount** | M12 X 1 mm thread (c-mount lens); microvideo lens 4.3, 6, 8, 12, 16, 25 mm |
| **Output Rating** | 150 mA |
| **Exposure Time** | 0.1 milliseconds to 1.049 seconds |
| **Construction** | Black PBT sensor housing; acrylic window iVu Plus Integrated: Die cast zinc and Black PBT |
| **External Strobe Output** | + 5 V dc |
| **Environmental Rating** | IP67 |
| **Model Specific** | |
| **Power Connection** | 12-pin Euro-style (M12) male connector Accessory cordset required for operation; QD cordsets are ordered separately. |
| **Supply Current** | 850 mA max. (exclusive of I/O load) |
| **USB 2.0 Host** | 4-pin Pico-style (M8) female connector<br>Optional USB cordset required for operation of USB Thumb Drive. QD cordsets are ordered separately. |
| **Ethernet Connection** | 4-pin Pico-style (M8) male connector. Ethernet cordsets are ordered separately. |
| **Output Configuration** | NPN or PNP, software selectable |
| **Display** | Integrated touch screen: 68.5 mm (2.7") LCD Color Integrated Display 320 x 240 pixels<br>Remote touch screen: See RD35 Remote Display specifications |
| **Acquisition** | Integrated and remote touch screen: 100 fps (frames per second) max. |
| **Operating conditions** | Stable Ambient Temperature:<br>Integrated touch screen: 0 to +45 °C Remote touch screen: 0 to +40 °C |
| **Remote Display connection** (Remote Touch Screen Models Only) | 8-pin Euro-style (M12) female connector Accessory cordset required for remote display; QD cordsets are ordered separately. |
| **Certifications** | NOTE: iVu Plus remote must use Euro QD power cordset for CE compliance. |

Remote display specifications on previous page.

# WLS15 Series

## Low Profile LED Strip Light

- Improves visibility, safety, and efficiency
- 15 mm low profile fits in tight spaces that other lights cannot
- Installs in minutes without impacting existing application framework
- Professional quality and certified product
- Applications see page 11, 20, 26

| Family | Cascadable | Color | Length (mm) | Window | Construction | Connector |
|---|---|---|---|---|---|---|
| WLS15 | X | DW | 0360 | D | S | C2 |
| | **C** = Cascadable<br>**X** = Non Cascadable | **DW** = Daylight White<br>**WW** = Warm White | **0220** **0640**<br>**0360** **0920**<br>**0500** **1200** | **D** = Diffused | **S** = Sealed (IP66, IP67) | **C2** = 2 m Integral<br>**QP** = 150 mm Integral Euro QD<br>**QS** = 150 mm Integral cable with Deutsch DTM |

LMBWLS15

LMBWLS15-150S

LMBWLS15MAG

**4-pin Euro-Style**

**MQDC-415**
5 m (15')
**MQDC-415RA**
5 m (15')

**2-pin Deutsch**
Single-ended cordset with straight connectors

**DTMC-215**
5 m (15')

Additional cordset lengths available on bannerengineering.com

## Specifications

**Supply Voltage and Current**

12 V dc or 24 V dc nominal
Absolute operational limits of 10 V dc to 15 V dc and 20 V dc to 27 V dc
Use only with a suitable Class 2 power supply (UL) or a SELV power supply (CE)
Light can be PMW dimmed between 25% to 100% with a frequency up to 1000 Hz

| Light Length (mm) | Typical Current (A) at 25 °C | | Maximum Current (A) at -40 °C | | Lumens | |
|---|---|---|---|---|---|---|
| | 12 V dc | 24 V dc | 12 V dc | 24 V dc | Daylight White | Warm White |
| 0220 | 0.19 | 0.10 | 0.24 | 0.12 | 175 | 170 |
| 0360 | 0.38 | 0.20 | 0.48 | 0.24 | 350 | 340 |
| 0500 | 0.57 | 0.30 | 0.72 | 0.36 | 525 | 510 |
| 0640 | 0.76 | 0.40 | 0.96 | 0.48 | 700 | 680 |
| 0920 | 1.14 | 0.60 | 1.44 | 0.72 | 1050 | 1020 |
| 1200 | 1.52 | 0.80 | 1.92 | 0.96 | 1400 | 1360 |

**Light Characteristics**

Color Temperature (CCT):
Daylight white: 5,000 K  Warm white: 3,000 K  CRI: 80 minimum

**Construction**

Clear anodized aluminum inner housing; Polycarbonate outer housing, Polyamide end caps

**Mounting**

Integral mounting slots for M4 (#8) screws, tighten to 5 in·ibf max torque
Multiple bracket options available

**Environmental Rating**

Rated IEC IP66 and IEC IP67  Suitable for wet locations per UL 2108

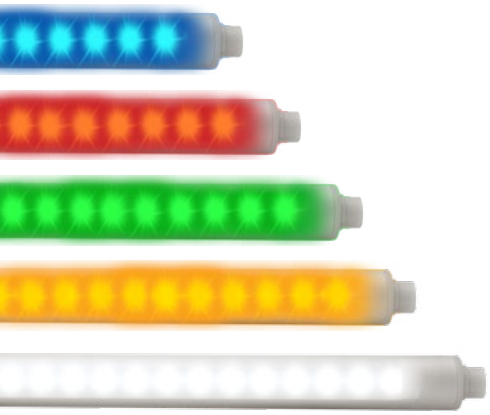
**Operating Conditions**

Temperature: –40 to +70 °C  Storage Temperature: –40 to +70 °C

**Application Notes**

When connecting cascadable lights in series it is important not to exceed maximum current limitations:
Maximum length of light at 12 V dc = 2.4 m  Maximum length of light at 24 V dc = 6 m

**Certifications**



# WLS27 Series

## LED Light Bar

- Encased in shatterproof, UV-stabilized, copolyester shells
- Round shape makes them suitable for laminar airflow applications
- Rugged, water-resistant IP66, IP67 and IP69K design
- Daisy chain power to multiple lights
- Capability to dim lights using the wiring pinout (Hi/Lo/Off)
- Automatic temperature protection built into the unit extends the product life
- Single- and dual-colored models available
- Applications see page 12, 19, 31

### Single Color

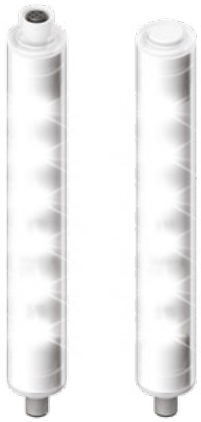
| Family | Cascadable | Color | Lighted Length (mm) | Window | Construction | Connector |
|---|---|---|---|---|---|---|
| WLS27 | X | W | 285 | D | S | Q |

- **Cascadable:** C = Cascadable; X = Non Cascadable
- **Color:** Blank = Cool White; WW = Warm White; R = Red; G = Green; B = Blue; Y = Yellow
- **Lighted Length (mm):** 145, 285, 430, 570, 710, 850, 990, 1130
- **Window:** D = Diffused Plastic
- **Construction:** S = Sealed
- **Connector:** Q = Integral Euro QD (dc)

### Dual-Color

| Family | Cascadable | Colors (C) | | | /Density (D) | Lighted Length (mm) | | Window | Construction | Connector |
|---|---|---|---|---|---|---|---|---|---|---|
| | | C1 | D1 | C2 | D2 | | | | | |
| WLS27 | X | W | | R | 2 | 285 | – | D | S | Q |

- **Cascadable:** C = Cascadable; X = Non Cascadable
- **Colors (C):** Blank = Cool White; WW = Warm White; R = Red; G = Green; B = Blue; Y = Yellow
- **Density:** Blank = 100%; 2 = 50%; 3 = 33%
- **Lighted Length (mm):** 145, 285, 430, 570, 710, 850, 990, 1130
- **Window:** D = Diffused Plastic
- **Construction:** S = Sealed
- **Connector:** Q = Integral Euro QD



First or Middle of Cascade

Stand-Alone or Cascade End Light

LMBWLS27EC

LMBWLS27H

LMBWLS27U

LMBWLS27SP

## Standard

**4-pin Euro-Style**

**MQDC-415**
5 m (15')
**MQDC-415RA**
5 m (15')

**4-pinEuro-Style QD Double-Ended Straight/Straight**

**MQDEC-403SS**
1 m (3')

| | Length | | |
|---|---|---|---|
| | Branches | Trunk | |
| **4-pin Euro-Style QD Splitter** | 0.3 m | 0.3 m | **CSB-M1241M1241** |

Additional cordset lengths available on bannerengineering.com

## IP69K Washdown

**4- pin M12 Euro-Style Washdown Cordset**
Straight connector models only

**MQDC-WDSS-0415**
5 m (15')

**4-pin Euro-Style QD Double-Ended Washdown**
Straight/Straight

**MQDEC-WDSS-403SS**
1 m (3')

Additional cordset lengths available on bannerengineering.com

## WLS27 Specifications

| | |
|---|---|
| **Supply Voltage and Current** | 12 to 30 V dc see data sheet for details by length |

**Lumens**

| Length (mm) | One-Color WLS27 Lumens (Typical @ 25 °C) | | | | | | Typical Wattage* (Watts) |
|---|---|---|---|---|---|---|---|
| | Cool White | Warm White | Red | Green | Blue | Yellow | |
| 145 | 325 | 325 | 55 | 180 | 40 | 50 | 3.6 |
| 285 | 650 | 650 | 110 | 360 | 80 | 100 | 7.2 |
| 430 | 975 | 975 | 165 | 540 | 120 | 150 | 11.0 |
| 570 | 1300 | 1300 | 220 | 720 | 160 | 200 | 14.6 |

| Length (mm) | One-Color WLS27 Lumens (Typical @ 25 °C) | | | | | | Typical Wattage* (Watts) |
|---|---|---|---|---|---|---|---|
| | Cool White | Warm White | Red | Green | Blue | Yellow | |
| 710 | 1625 | 1625 | 275 | 900 | 200 | 250 | 18.5 |
| 850 | 1950 | 1950 | 330 | 1080 | 240 | 300 | 22.1 |
| 990 | 2275 | 2275 | 385 | 1260 | 280 | 350 | 25.9 |
| 1130 | 2600 | 2600 | 440 | 1440 | 320 | 400 | 29.8 |

*Typical operating wattage is measured at 24 V dc

| | |
|---|---|
| **Light Characteristics** | Color: Cool white Color temperature (CCT): 6000–7100K |
| **Useful Life** | Lumen Maintenance - L70 When operating within specifications, output will decrease less than 30% after 50,000 hours. |
| **Construction** | Clear anodized aluminum housing; FDA-grade copolyester outer housing |
| **Mounting** | Bracket LMBWLS27EC included (2 for lights up to 570 mm or 3 for lights 710 mm and longer); see datasheet for additional options |
| **Environmental Rating** | IEC IP66, IP67, and IP69K, per DIN 40050 |
| **Operating Conditions** | –40 to +70 °C |
| **Certifications** | CE c UL us LISTED D |

# WLB32 Series

## LED Light Bar

- Banner's WLB32 is an ultra-bright LED fixture that features an even light output for a no glare 'glow'
- Highly energy efficient for overall cost savings
- High/Low/OFF switch
- Daisy chain power to multiple lights
- Metal housing, shatterproof window
- Easy installation with snap clips, or a choice of magnetic or angle brackets
- Applications see page 11, 20, 26

## WLB32

Example Model Number: WLB32C285PBQ

| Family | Power | Cascadable | Lighted Length (mm) | Shield | Control | Connector | Plug Type** |
|---|---|---|---|---|---|---|---|
| WLB32 | | C | 285 | | PB | Q | |

**Power**
- **Blank** = DC
- **Z** = AC

**Cascadable**
- **C** = Cascadable

**Lighted Length (mm)**
- **285**
- **570**
- **850**
- **1130**

**Shield**
- **Blank** = No shield
- **E** = Eye shield

**Control**
- **Blank** = None
- **M** = Motion Switch
- **PB** = Hi/Lo/OFF Switch

**Connector**
- **Blank** = 2 m Integral Cable (dc)
- **Q** = Integral Euro QD (dc)
- **QM** = AC

**Plug Type****

** Only needed for AC models

- **B** = North & Central America, Japan, Taiwan
- **D** = India, Sri Lanka, Nepal, Namibia
- **EF** = France, Belgium, Slovakia, Tunisia, Germany, Austria, Netherlands, Spain, S. Korea, Turkey, Poland
- **G** = UK, Ireland, Cyprus, Malta, Malaysia, Singapore, Hong Kong, Vietnam
- **I** = Australia, New Zealand, Papua New Guinea, Argentina, China
- **N** = Brazil, South Africa
- **C** = AC connector with flying leads
- **Blank** = AC (no power cord)


Cascadable


AC or DC


Hi/Low/Off Switch


Motion Detection


Eye Shield

LMBWLB32

LMBWLB32-180S

LMBWLB32MAG

LMBWLB32U

LMBWLB32UT

## Cordsets for DC Models

**4-pin Euro-Style**

**MQDC-415**
5 m (15')
**MQDC-415RA**
5 m (15')

**4-pinEuro-Style QD Double-Ended**
Straight/Straight or Straight/Right-angle

**MQDEC-403SS**
1 m (3')
**MQDEC-403RS**
1 m (3')

**4-pin Euro-Style QD Splitter**

| Length | | | |
|---|---|---|---|
| Branches | Trunk | | |
| 0.3 m | 0.3 m | **CSB-M1241M1241** | |

Additional cordset lengths available on bannerengineering.com

## Cordsets for AC Models

**Double-Ended**
NEMA 5-15 grounded
(IEC Type B)

**LQMAC-306B**
2 m (6.5')

**Double-Ended**
For Cascading
Straight/Straight

**LQMAEC-312SS**
3 m (12')

Additional cordset lengths available on
bannerengineering.com

## Specifications

| | |
|---|---|
| Supply Voltage and Current | 12 to 30 V dc<br>90 to 264 V ac |

| Lighted Length (mm) | Max Current Draw (A) | | Typical Current Draw (A) | | | | | Lumens |
|---|---|---|---|---|---|---|---|---|
| | DC | AC (at 90 V ac) | 12 V DC | 24 V DC | 30 V DC | 120 V ac | 230 V ac | |
| 285 | 0.8 | 0.125 | 0.66 | 0.31 | 0.24 | 0.075 | 0.045 | 650 |
| 570 | 1.6 | 0.250 | 1.36 | 0.62 | 0.48 | 0.150 | 0.080 | 1300 |
| 850 | 2.4 | 0.375 | 2.19 | 0.93 | 0.72 | 0.225 | 0.115 | 1950 |
| 1130 | 3.2 | 0.500 | 3.02 | 1.24 | 0.96 | 0.300 | 0.150 | 2600 |

| | |
|---|---|
| Light Characteristics | Color: Daylight white  Color temperature (CCT): 5000K (±300K) |
| Useful Life | Lumen Maintenance - L70 When operating within specifications, output will decrease less than 30% after 50,000 hours. |
| Push Button | II = 100% intensity  I = 50% intensity  0 = Off |
| Construction | Anodized aluminum housing; polycarbonate window and end caps; stainless steel mounting brackets |
| Mounting | Snap clips; magnetic mount or swivel bracket accessories available |
| Environmental Rating | IEC IP50 |
| Operating Conditions | DC models: –40 C to 70 °C  AC models: –25 to 45 °C |
| Certifications | |

# WLB92 Series

## LED Light Bar

- Increase worker productivity and ergonomics with bright, high-quality, uniform light
- Durable light stands up in your environment with a rugged metal housing and shatterproof light cover
- No maintenance time or cost with long-life, energy-efficient LEDs
- Flexibility to place light where needed with ac and dc models
- Easy installation with variety of mounting options: surface, swivel, snap and hanging brackets
- AC models are DLC certified and have a five year warranty
- Applications see page 26

### 24 V DC

| Family | Cascadable | Color | Lighted Length (mm) | Control | Connector |
|---|---|---|---|---|---|
| WLB92 | X | | 550 | PB | Q |
| | **X** = Non Cascadable | **Blank** = Daylight White<br>**WW** = Warm White<br>**R** = Red<br>**G** = Green<br>**B** = Blue<br>**Y** = Yellow | **550**<br>**1100** | **PB** = Switch and Dimming Knob* | **Blank** = 2 m Integral Cable (dc)<br>**Q** = Integral Euro QD (dc) |

* Models include dimming knob for manual intensity control

### 100-277 V AC

| Family | Voltage | Cascadable | Color | Lighted Length (mm) | Control | Connector | Plug Type** |
|---|---|---|---|---|---|---|---|
| WLB92 | Z | C | | 550 | PB | QM | B |
| | **Z** = AC | **C** = Cascadable | **Blank** = Daylight White<br>**WW** = Warm White<br>**R** = Red<br>**G** = Green<br>**B** = Blue<br>**Y** = Yellow | **550**<br>**1100** | **A** = 0-10 V Analog Dimming (Conduit CT models)<br>**PB** = Switch and Dimming Knob (AC QM models) | **QM** = AC†<br>**CT** = Conduit Entry†† | **** Only needed for AC QM models**<br>**B** = North & Central America, Japan, Taiwan<br>**D** = India, Sri Lanka, Nepal, Namibia<br>**EF** = France, Belgium, Slovakia, Tunisia, Germany, Austria, Netherlands, Spain, S. Korea, Turkey, Poland<br>**G** = UK, Ireland, Cyprus, Malta, Malaysia, Singapore, Hong Kong, Vietnam<br>**I** = Australia, New Zealand, Papua New Guinea, Argentina, China<br>**N** = Brazil, South Africa<br>**C** = AC connector with flying leads<br>**Blank** = AC (no power cord) |

† Models with a connector include ON/OFF switch as well as a dimming knob for intensity control

†† Conduit entry models include dimmability via a 0 to 10 V input circuit

LMBWLB92

LMBWLB92CLIP

LMBWLB92HK5

LMBLWB92S

LMBWLB92RAS

**4-pin Euro-Style**

**MQDC-415**
5 m (15')
**MQDC-415RA**
5 m (15')

**Double-Ended**
For Cascading
straight/straight

**LQMAEC-306SS**
2 m (6.5')

Additional cordset lengths available on
bannerengineering.com

## Specifications

| | |
|---|---|
| Supply Voltage and Current | 24 V dc +/- 10%<br>100 to 277 V ac |

| Lighted Length (mm) | Max Current Draw (A) | | Typical Current Draw (A) | | | | Lumens |
|---|---|---|---|---|---|---|---|
| | DC | AC (at 90 V ac) | 24 V DC | 120 V ac | 230 V ac | 277 V ac | |
| 550 | 1.75 A | 0.425 A | 1.45 A | 0.295 A | 0.160 A | 0.145 A | 3130 |
| 1100 | 3.5 A | 0.850 A | 2.9 A | 0.590 A | 0.310 A | 0.260 A | 6500 |

| | |
|---|---|
| Light Characteristics | Color: Daylight white<br>Color temperature (CCT): 5000K (±300K)<br><br>Color: Warm white<br>Color temperature (CCT): 3,000 K |
| Useful Life | Lumen Maintenance - L70 When operating within specifications, output will decrease less than 30% after 50,000 hours. |
| Construction | Anodized aluminum housing; polycarbonate window and end caps |
| Mounting | Several options available; see above and datasheet |
| Environmental Rating | IEC IP40 |
| Operating Conditions | See datasheet |
| Certifications | AC daylight white models only |

# TL50 Tower Lights

## Preconfigured Tower Lights

LASER MARKING AVAILABLE

IO-Link®

- Exceptionally bright, highly visible from a distance
- Install quickly and easily with no assembly required
- Clearly evident on/off status
- Versatile mounting options
- Compact, sleek, rugged design with IP67 models available
- Audible alert: continuous, pulsed and staccato models available
- Models available with IO-Link communication
- Applications see page 20

| Housing | Brightness | Supply Voltage | Color Position 1 | 2 | 3 | 4 | 5 | 6** | 7** | Audible Alarm | Control | Housing Color | Connection |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TL50 | H | | G | R | Y | | | | | | K | | Q |

**Brightness**
**Blank** = Standard
**H** = High Brightness

**Supply Voltage**
**Blank (1 to 5 colors)** = 18 to 30 V dc or 21 to 27 V ac
**Blank (6 or 7 colors)** = 12 to 30 V dc or 21 to 26 V ac
**Z** = 100 to 240 V ac

**Color Position**
**G** = Green
**Y** = Yellow
**R** = Red
**B** = Blue
**W** = White
**T** = Turquoise
**O** = Orange
**V** = Violet
**S** = Sky Blue
**M** = Magenta
**Blank** = Audible Only

**Audible Alarm**
**Blank** = None (IP67)
**A** = Audible (IP50)
**ALS** = Sealed Audible Continuous Tone
**ALS3** = Sealed Audible Pulsed Tone
**ALS4** = Sealed Audible Staccato Tone
**AOS** = Omni-Directional Sealed Audible Continuous Tone
**AOSI** = Omni-Directional Sealed Audible Continuous Tone with Intensity Adjust
**AOS3** = Omni-Directional Sealed Audible Pulsed Tone
**AOS3I** = Omni-Directional Sealed Audible Pulsed Tone with Intensity Adjust
**AOS4** = Omni-Directional Sealed Audible Staccato Tone
**AOS4I** = Omni-Directional Sealed Audible Staccato Tone with Intensity Adjust

**Control**
**K** = IO-Link†

**Housing Color**
**Blank** = Black
**C** = Gray

**Connection**
**Blank** = 2 m Integral Cable
**Q** = Euro Integral QD (dc only)
**QP** = Euro Pigtail QD (Available with Micro Pigtail QD for ac models if 4 segments or less)

* These colors are not available in the high brightness models

** Positions 6 and 7 not available in high brightness models; Position 7 not available with audible

† IO-Link not available on high brighness or ac models

**Audible**
max. intensity 92 db
@ 1 meter (typical)

**Sealed**
max. intensity 94 db
@ 1 meter (typical)

**Sealed Omni-Directional**
max. intensity 99 db
@ 1 meter (typical)

SMB30A

SMB30MM

SMBAMS30P

SMB30RAVK

Euro-Style

| 3 Lights/4-Pin | 4 Lights/5-Pin | 5+ Lights/8-Pin |
|---|---|---|
| **MQDC-415**<br>5 m (15')<br>**MQDC-415RA**<br>5 m (15') | **MQDC1-515**<br>5 m (15')<br>**MQDC1-515RA**<br>5 m (15') | **MQDC2S-815**<br>5 m (15')<br>**MQDC2S-815RA**<br>5 m (15') |

Micro-Style

| 3 Lights/4-Pin | 4 Lights/5-Pin |
|---|---|
| **MQADC-415**<br>5 m (15')<br>**MQADC-415RA**<br>5 m (15') | **MQDAC2-515**<br>5 m (15')<br>**MQDAC2-515RA**<br>5 m (15') |

Additional lengths available on bannerengineering.com

Elevated Mount System

Foldable Bracket

Additional mounting options are available on bannerengineering.com

## Specifications

| | |
|---|---|
| **Supply Voltage and Current** | DC models:<br>18 to 30 V dc (10% max. ripple); or 21 to 27 V ac<br>Standard Brightness:<br>Indicators: 45 mA max. current per LED color<br>Standard Audible Alarm (IP50): @ 25 mA max. current<br>Sealed Audible Alarm (IP67): 35 mA max. current<br>Omni-Directional Sealed Audible Alarm: 45 mA max. current<br>High Brightness: max. current per LED color:<br>Indicators: 18 V dc—100 mA; 30 V dc—60 mA; 21 V ac—80 mA; 27 V ac—70 mA<br>Standard Audible (IP50): 25 mA max. current<br>Sealed Audible Alarm (IP67): 35 mA max. current<br>Audible only: @ 45mA max.<br>AC models:<br>100 to 240 V ac; 50 or 60 Hz |
| **Indicators** | LEDs are independently selected— Green, Yellow, Red, Blue, White, Turquoise, Orange, Violet, Sky Blue or Magenta;<br>1-7 colors depending on model |
| **Supply Protection Circuity** | Protected against reverse polarity and transient voltages |
| **Input Response Time** | Indicators ON/OFF (dc): 10 milliseconds (max.)<br>Indicators ON/OFF (ac): 500 milliseconds (max.) |
| **Audible Alarm** | Audible measurements are made in the direction sound exits the device. For standard audible models, this is the top of the unit (when mounted vertically, sound is directed toward the ceiling). For sealed audible models (IP67), sound exits the vented openings in the side of the unit, which should be oriented so that the sound is directed toward the machine operator(s). In environments with high ambient noise levels or high ceilings that absorb sound, the sealed version is recommended.<br>Standard Audible Alarm: 2.7 KHz ± 500 Hz oscillation frequency; max. intensity 92 db @ 1 meter (typical)<br>Sealed Audible Alarm: 29 KHz to 250 Hz oscillation frequency; max. intensity 94 db @ 1 meter (typical)<br>Omni-Directional Sealed Audible Alarm with Intensity Adjustment: 2.1 KHz ± 250 Hz oscillation frequency; max intensity 95 dB at 1 meter (3.3 ft) (typical) |
| **Audible Adjustments** | Standard Audible Alarm: Unscrew the cover (up to 1.5 turns max.) to adjust the audible intensity. (Do not exceed 1.5 turns or the cover may detach during operation.) For max. intensity, rotate the center plug 180° counterclockwise to remove it.<br>Sealed Audible Alarm and Omni-Directional Sealed Audible Alarm with Intensity Adjustment: Rotate the front cover until the desired intensity is reached. |
| **Construction** | Bases and Covers: ABS  Light Segment: Polycarbonate |
| **Environmental Rating** | General-Purpose: IEC IP67  Audible: IEC IP50 or IEC IP67, depending on model |
| **Operating Conditions** | General-Purpose: –40 to +50 °C<br>Audible: –20 to +50 °C<br>Relative Humidity: 95% @ 50 °C (non-condensing)<br>Storage Temperature: –40 to +70 °C |
| **Certifications** | CE c UL us LISTED |

LASER MARKING AVAILABLE

# TL70 Series

## Tower Lights

- Light segments have user-selectable solid ON or flashing
- Up to six light segments (six color options) or five segments plus an audible in one device
- Rugged, water-resistant IP65 housing with UV stabilized material
- Bright, uniform indicator segments appear gray when off to eliminate false indication from ambient light
- Applications see page 37

### Preassembled DC

| Housing | Color/Position 1 | 2 | 3 | 4 | 5 | 6 | Audible Alarm* | Housing Color | Connection |
|---|---|---|---|---|---|---|---|---|---|
| TL70 | G | R | Y | B | W | O | | | Q |

**G** = Green, **Y** = Yellow, **R** = Red, **B** = Blue, **W** = White, **O** = Orange, **Blank** = None

**Audible Alarm*:** **Blank** = None; **A** = Audible (92 dB); **AL** = Louder Audible (85 -101 dB); **AP** = Programmable Audible

**Housing Color:** **Blank** = Black; **C** = Gray

**Connection:** **Blank** = 2 m Integral Cable; **T** = Terminal Wired; **Q** = Euro Integral QD; **QP** = Euro Pigtail QD

### Preassembled AC

| Housing | Color/Position 1 | 2 | 3 | 4 | 5 | 6 | Audible Alarm* | Housing Color | Connection |
|---|---|---|---|---|---|---|---|---|---|
| TL70Z | G | R | Y | B | W | O | | | Q |

**G** = Green, **Y** = Yellow, **R** = Red, **B** = Blue, **W** = White, **O** = Orange, **Blank** = None

**Audible Alarm*:** **Blank** = None; **A** = Audible (92 dB); **AL** = Louder Audible (85 -101 dB); **AP** = Programmable Audible

**Housing Color:** **Blank** = Black; **C** = Gray

**Connection:** **Blank** = 2 m Integral Cable; **Q** = 1/2-20/Micro-style Integral QD**

* Not available with six light modules

** Models with Q are limited to 4 modules

### Preassembled Wireless

| Housing | Radio | Color/Position 1 | 2 | 3 | 4 | 5 | 6 | Audible Alarm* | Housing Color | Connection |
|---|---|---|---|---|---|---|---|---|---|---|
| TL70 | DXN2 | W | B | G | Y | R | O | | | Q |

**DXN2** = Node 2.4 GHz; **DXN9** = Node 900 MHz; **DR2M** = MultiHop Data Radio 2.4 GHz; **DR9M** = MultiHop Data Radio 900 MHz

**G** = Green, **Y** = Yellow, **R** = Red, **B** = Blue, **W** = White, **O** = Orange, **Blank** = None

**Audible Alarm*:** **Blank** = None; **A** = Audible (92 dB); **AL** = Louder Audible (85 -101 dB); **AP** = Programmable Audible

**Housing Color:** **Blank** = Black; **C** = Gray

**Connection:** **Blank** = 2 m Integral Cable; **Q** = Euro Integral QD; **QP** = Euro Pigtail QD

Requires Gateway or master radio of the same frequency

SMB30A

SMB30MM

SMBAMS30P

SMB30RAVK

Euro-Style

| 3 Lights/4-Pin | 4 Lights/5-Pin | 5+ Lights/8-Pin |
|---|---|---|
| **MQDC-415**<br>5 m (15')<br>**MQDC-415RA**<br>5 m (15') | **MQDC1-515**<br>5 m (15')<br>**MQDC1-515RA**<br>5 m (15') | **MQDC2-815**<br>5 m (15')<br>**MQDC2-815RA**<br>5 m (15') |

Micro-Style
For AC models

| 3-Lights/4-Pins | 4 Lights/5-Pin |
|---|---|
| **MQAC2-415**<br>5 m (15') | **MQAC2-515**<br>5 m (15') |

Additional cordset lengths available on bannerengineering.com

## Specifications

| | | |
|---|---|---|
| **Supply Voltage and Current** | 12 to 30 V dc<br>Indicators—Maximum current per LED color:<br>Blue, Green, White: 420 mA at 12 V dc; 145 mA at 30 V dc<br>Red, Yellow, Orange: 285 mA at 12 V dc; 120 mA at 30 V dc<br>Audible:<br>Standard: 30 mA at 12 to 30 V dc<br>Loud: 350 mA at 12 V dc; 110 mA at 30 V dc<br>Multitone: 270 mA at 12 V dc; 110 mA at 30 V dc<br>Programmable: 250 mA at 12 V dc; 110 mA at 30 V dc | 100 to 240 V ac; 50/60 Hz<br>Maximum current per color or audible module:<br>70 mA at 120 V ac and 60 Hz<br>50 mA at 230 V ac and 50 Hz |
| **Supply Protection Circuity** | Protected against reverse polarity and transient voltages | |
| **Indicator Response Time** | DC models:<br>OFF Response: 150 µs (maximum) at 12 to 30 V dc<br>ON Response: 180 ms (maximum) at 12 V dc;<br>50 ms (maximum) at 30 V dc | AC models:<br>OFF Response: 150 µs (maximum) at 12 to 30 V dc<br>ON Response: 180 ms (maximum) at 12 V dc;<br>50 ms (maximum) at 30 V dc |
| **Audible Alarm** | 2.6 KHz ± 250 Hz oscillation frequency; maximum intensity 92 dB at 1 m (3.3 ft) (typical) | |
| **Audible Adjustments** | Rotate the cover until the desired volume is reached<br>Change in sound intensity from fully open to fully closed is 8 dB | |
| **Radio Range (Wireless Models)** | 900 MHz, 1 Watt (Internal antenna): Up to 3.2 km (2 miles)<br>2.4 GHz, 65 mW (Internal antenna): Up to 1000 m (3280 ft) with line of sight | |
| **Minimum Separation Distance (Wireless Models)** | 900 MHz, 1 Watt: 4.57 m (15 ft)<br>2.4 GHz, 65 mW: 0.3 m (1 ft) | |
| **Construction** | Bases, segments and Covers: Polycarbonate | |
| **Environmental Rating** | IEC IP65 | |
| **Operating Conditions** | –40 to +50 °C<br>Relative Humidity: 95% @ 50 °C (non-condensing)<br>Storage Temperature: –40 to +70 °C | |
| **Certifications** | CE c UL us LISTED | |

# K50L2 and K30L2

## Domed Indicators

- Get seven colors via only three inputs
- Save controller outputs and wiring
- Improve production efficiency through enhanced visual management
- Install wherever you need indication to improve communication and productivity
- Standardize to simplify ordering and spare parts
- Collaborate with Banner on custom models
- Applications see page 12, 19

| Family | Material | Color | Input | Audible Alarm* | Connection |
|---|---|---|---|---|---|
| **K50L2** | | **RGB** | **7** | **A1** | **Q** |
| **K50L2**<br>**K30L2** | **Blank** = Standard<br>**F** = FDA Grade | **RGB** = Multicolor | **7** = 7 colors<br>**K** = IO-Link†† | **Blank** = No Audible<br>**A1** = Audible<br>**AL1** = Loud Audible<br>**ALS** = Sealed Audible | **Blank** = 2 m Integral Cable†<br>**Q** = Euro Integral QD**<br>**QP** = Euro Pigtail QD |

* Audible models not available in FDA-grade material
** Integral QD not available in FDA-grade material
† IO-Link models not available with integral cable
†† IO-Link not available in K30L2 models



**SMB30FA**


**SMB22FVK**


**SMB30SC**


**SMB30A**

K30L2 accessories listed on next page.

**4- pin Euro QD**

**MQDC-415**
5 m (15')
**MQDC-415RA**
5 m (15')

Additional lengths available on bannerengineering.com

## Specifications

| | |
|---|---|
| **Supply Voltage and Current** | K50L2: 10 to 30 V dc; 220 mA Max. at 10 V dc; 100 mA Max. at 30 V dc<br>K30L2: 10 to 30 V dc; 60 mA Max. at 10 V dc; 30 mA Max. at 30 V dc |
| **Construction** | Polycarbonate housing |
| **Environmental Rating** | K50L2: Standard: IEC IP66/IP67/IP69K<br>Standard Audible: IEC IP50<br>Sealed Audible: IEC IP66/IP67/IP69K<br>K30L2: IEC IP66/IP67/IP69K |
| **Operating Temperature** | –40 to 50 °C |
| **Certifications** | CE c UL us LISTED |

# S22 Touch Series

## Flat Touch Button

- Large, bright illuminated area for clear visibility of input and touch status
- Flush mount design sits tight against panel, machine and bracket surfaces
- Independent color control or preconfigured models to suit your indication needs
- Momentary versions remain activated as long as touch is present, while latching versions toggle between activated and not activated states on successive touches
- Excellent immunity to false triggering by water spray, detergents, oils, and other foreign materials
- Rugged, water-resistant IP69K design for washdown environments
- Ergonomically designed to eliminate hand, wrist and arm stresses, requiring no physical pressure to operate and can be actuated with bare hands or work gloves
- Applications see page 12, 19

## Multipurpose Independent Control

| Family | Output State | Output Function | Activation Method | Material | Color | Function | Connector |
|---|---|---|---|---|---|---|---|
| S22 | A | M | T | S | RGB7 | F2 | QP |
| | **A** = Normally Open<br>**R** = Normally Closed | **M** = Momentary<br>**L** = Latching | **T** = Touch | **S** = Standard<br>**F** = FDA Grade | **RGB7** = RGB Multicolor (7colors) | **F2** = Multifunction | **Blank** = 2 m Integral Cable<br>**QP** = Euro Pigtail QD |

## Illuminated Button Control

| Family | Output State | Output Function | Activation Method | Material | Color (not activated / activated) | Function | Connector |
|---|---|---|---|---|---|---|---|
| S22 | A | L | T | S | G / R | H | Q |
| | **A** = Normally Open<br>**R** = Normally Closed | **M** = Momentary<br>**L** = Latching | **T** = Touch | **S** = Standard<br>**F** = FDA Grade | **G** = Green<br>**Y** = Yellow<br>**R** = Red<br>**B** = Blue<br>**W** = White<br>**X** = Not used | **H** = Output only | **Blank** = 2 m Integral Cable<br>**Q** = Euro Integral QD<br>**QP** = Euro Pigtail QD<br>**T** = Terminal Screws |

SMB22A

SMB22FVK

SMBAMS22P

SMB22RAVK

**5-pin Euro QD**

**MQDC1-515**
5 m (15')
**MQDC1-515RA**
5 m (15')

**5- pin M12 Euro-Style Washdown Cordset**
Straight connector models only

**MQDC-WDSS-0515**
5 m (15')

Additional lengths available on bannerengineering.com

## Specifications

| | |
|---|---|
| **Supply Voltage** | 10 to 30 V dc |
| **Supply Current** | 80 mA max current (exclusive of load) |
| **Supply Protection Circuitry** | Protected against reverse polarity and transient voltages |
| **Construction** | Housing: Polycarbonate or FDA grade plastic, depending on model<br>Translucent dome: Polycarbonate or FDA grade plastic, depending on model<br>Mounting Nut: PBT |
| **Environmental Rating** | Standard: UL Type 4x, 13 FDA Grade: UL Type 4x<br>Cable, Pigtail, QD models: IEC IP66, IP67, IP69K per DIN 40050-9 on front and back<br>Terminal models: IEC IP66, IP67, IP69K per DIN 40050-9 on front only |
| **Connections** | 2 m PVC integral cable, integral Euro-style QD, 150 mm Euro-style pigtail QD or terminal |
| **Operating Conditions** | Temperature: –40 to +50 °C Storage Temperature: –40 to +70 °C |
| **Certifications** | CE cULus LISTED |

LASER MARKING AVAILABLE

# K70L Series

## Medium-Sized Domed Indicator

- Bright, uniform indicator light
- All models have flashing input control
- Models are available with up to five colors in one device
- Rugged, water-resistant IP65-rated design
- 12 V to 30 V dc operations
- Wireless options available in either 900 MHz and 2.4 GHz ISM Bands
- Applications see page 37

## Standard and Wireless

| Family | Model | Color | | | | | Input* | Connection |
|---|---|---|---|---|---|---|---|---|
| K70 | L | W | B | G | Y | R | P | Q |

**L** = Standard
**DXN2** = Wireless 2.4 GHz
**DXN9** = Wireless 900 MHz

**G** = Green
**Y** = Yellow
**R** = Red
**B** = Blue
**W** = White

**P** = PNP
**N** = NPN

*Leave blank for wireless

**Blank** = 2 m Integral Cable
**Q** = Euro Integral QD
**QP** = Euro Pigtail QD

SMB30FA

SMB22FVK

SMB30SC

SMB30A

4-pin Euro QD

**MQDC-415**
5 m (15')
**MQDC-415RA**
5 m (15')

Additional lengths available on bannerengineering.com

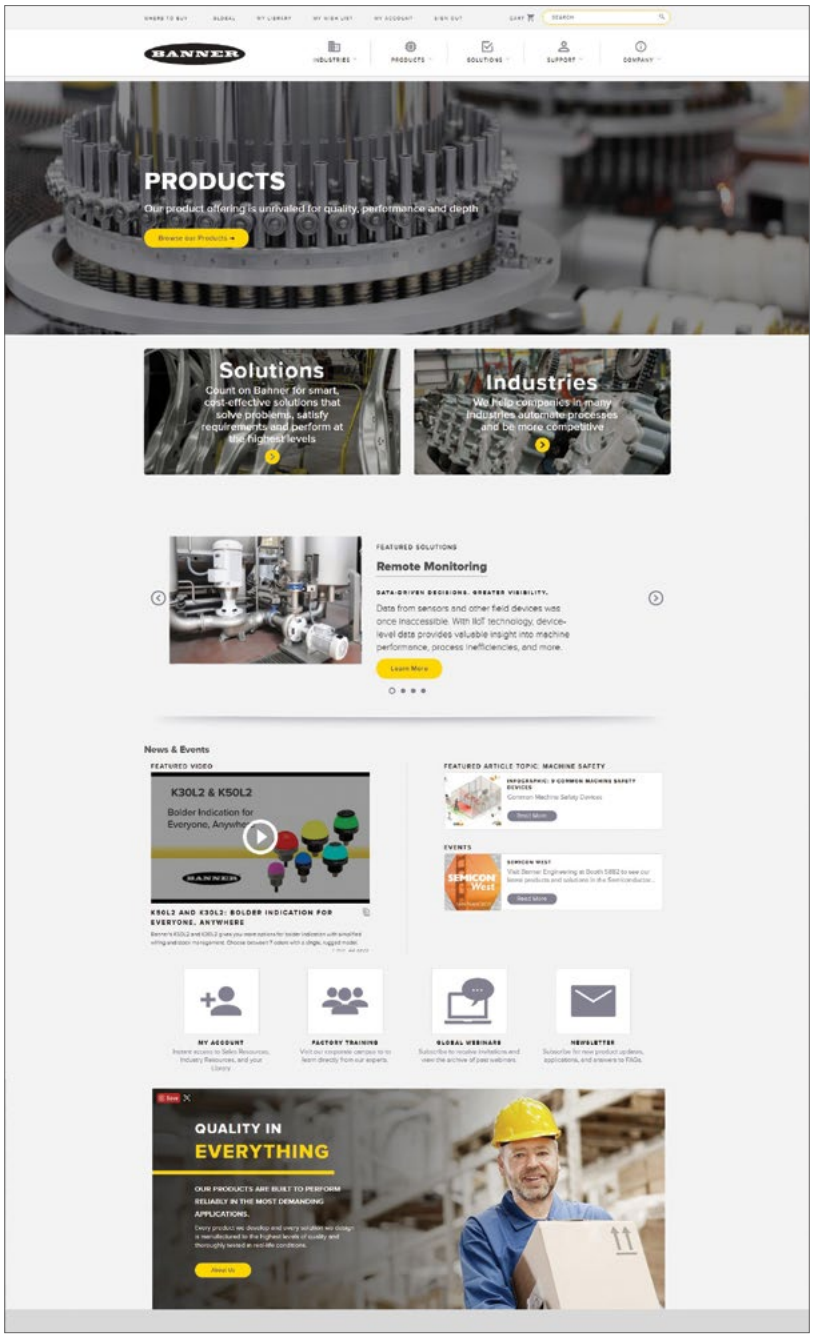
## Specifications

| | |
|---|---|
| **Supply Voltage and Current** | K70L: 12 V to 30 V dc; 200 mA Max. at 12 V dc; 90 mA Max. at 30 V dc |
| **Supply Protection Circuitry** | Protected against reverse polarity, transient voltages |
| **Construction** | Polycarbonate housing |
| **Environmental Rating** | K70L: IEC IP65 |
| **Operating Temperature** | –40 to 50 °C |
| **Certifications** | CE c UL us LISTED Depending on model) |

# More Information Online

For the latest products, brackets, cordsets, accessories, and new solutions, find us on the web at www.bannerengineering.com.

You also have access to more detailed information such as engineering drawings, complete specifications, installation instructions, product configurators and product videos.



# How to Reach Us

## Global Sales and Support

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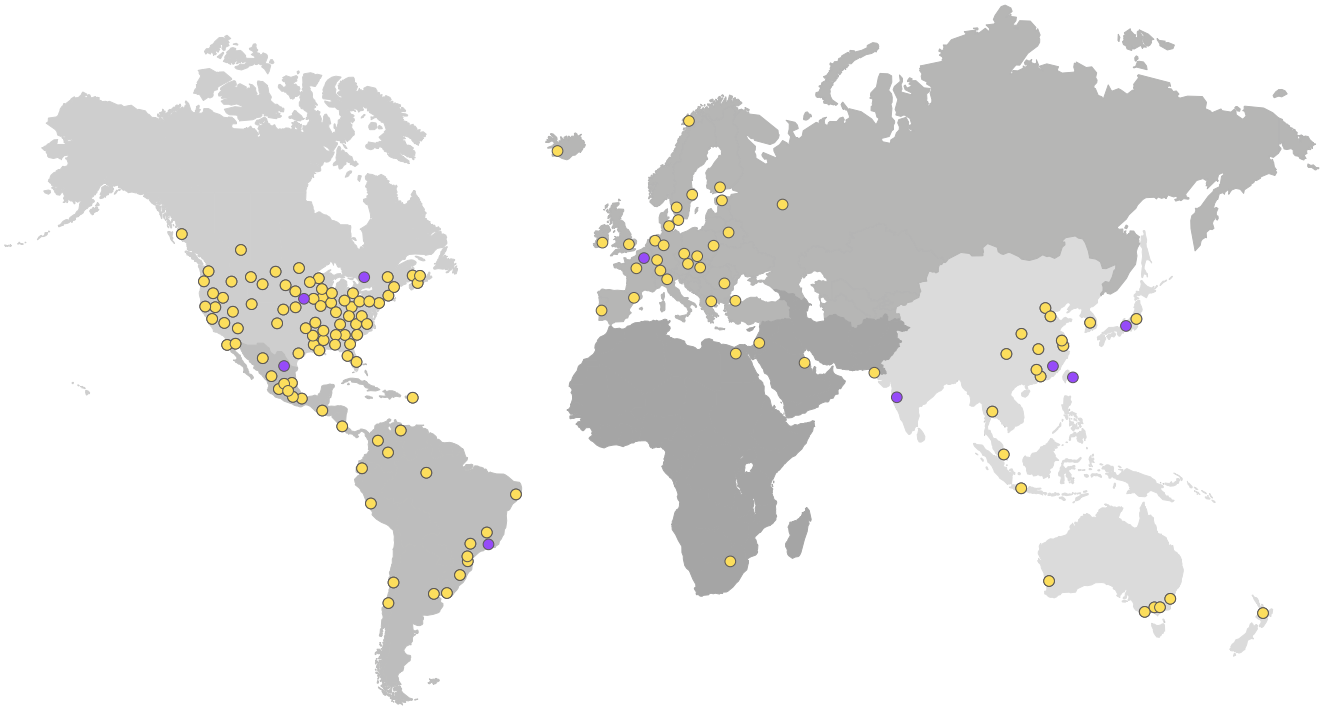

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