Solutions for the Automotive Industry

BANNER®

more sensors, more solutions

More Solutions for the Automotive Industry

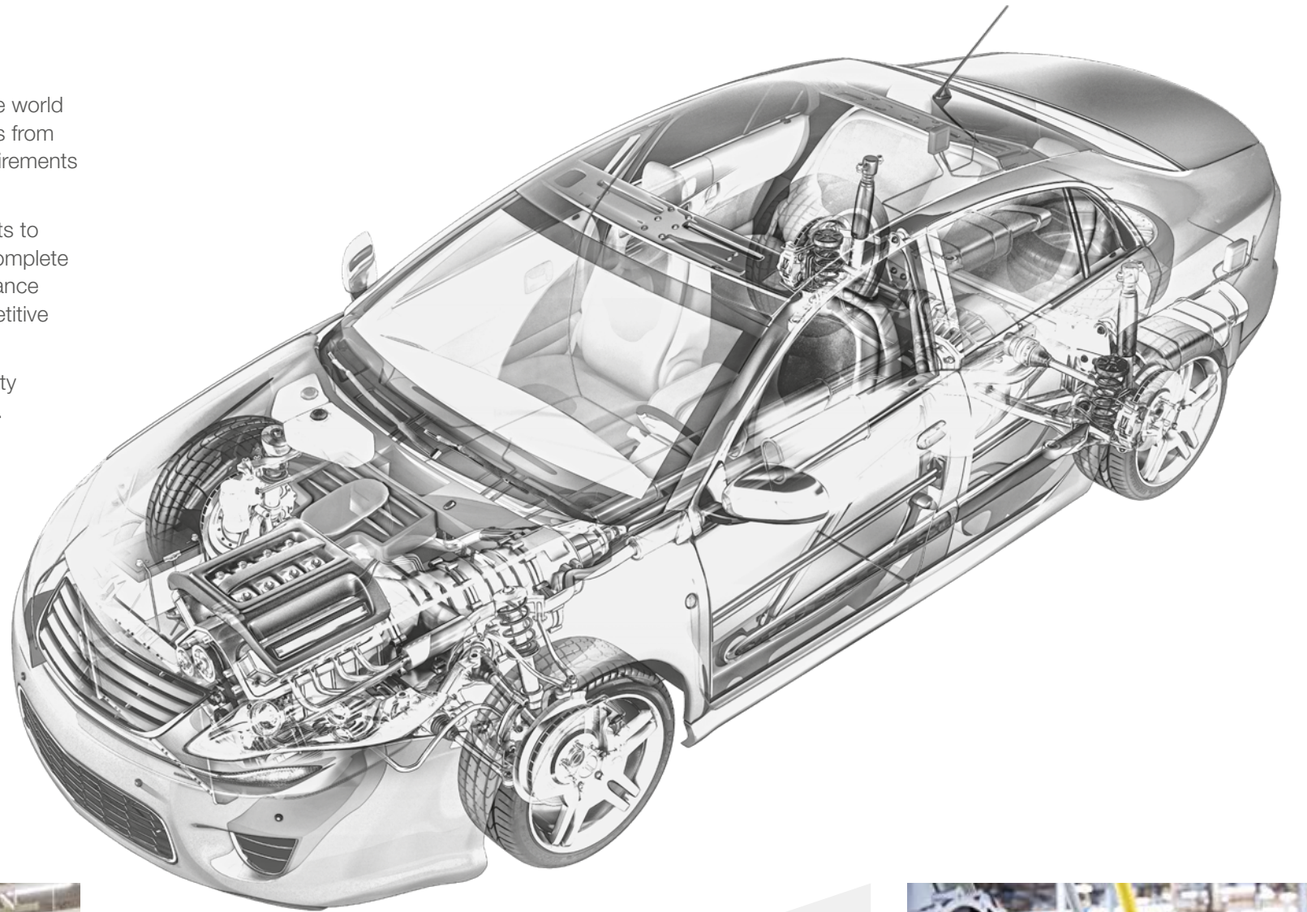
Press Shop

- Material handling
- Stamping & metal fabrication
- Sub-assembly

OEM and Tier One part suppliers from around the world rely on automation control products and solutions from Banner Engineering to meet the demanding requirements of the automotive manufacturing industry.

From the stamping, moulding and welding of parts to the complex assembly of subcomponents and complete automobiles, Banner provides solutions that enhance your production processes and give you a competitive edge in the global market.

Banner offers technologies and solutions for facility management, energy efficiency and cost savings.



General Assembly

- Chassis assembly
- Trim, fit and finish
- Final assembly

Intelligent Solutions for Complex Processes

Body Shop

- Automated welding
- Application of adhesives, beads and sealants
- Robot-intensive assembly

Paint Shop

- Cleaning of finished body
- Sealing and adding primer
- Painting and top coating
- Cure and drying
- Material handling and robotics

Powertrain

- Casting of engines and transmissions
- Machining
- Heat treatment
- Assembly and test
- Material handling

Press Shop

Banner sensors are used in nearly all areas of the press shop. They ensure stable processes, optimum load, quality inspection and right-on-time production of finished parts.

Metal Roll Diameter and Unwind Speed

Challenge

During metal stamping, it is important to accurately determine the diameter of a roll of sheet metal to prevent the material from running out.

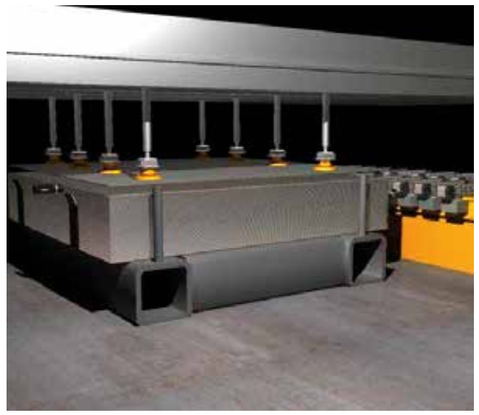
Solution

- The LE550 laser measurement sensor accurately measures challenging targets like shiny and reflective surfaces.
- The laser sensor's intuitive user interface makes it easy to adjust settings and set up a roll diameter application, without needing to unwind the roll.

LE Series Laser Measurement Sensor

For detailed product information, see page 21.

Double Sheet Detection



Challenge

Double sheet detection helps prevent feeding multiple sheets into a stamping machine, which can cause damage and costly downtime.

Solution

- The Banner VE Series Smart Camera is a reliable, non-contact solution.
- Banner offers a variety of vision sensors, lenses and lighting to accommodate a range of metal thickness and distance to target.

VE Series Smart Camera

For detailed product information, see page 25.

Error Proofing

Challenge

Many stamped metal parts have punch holes to accommodate other parts in the assembly process. Occasionally, the hole-punch does not go all the way through, leading to inconsistencies in the stamped parts.

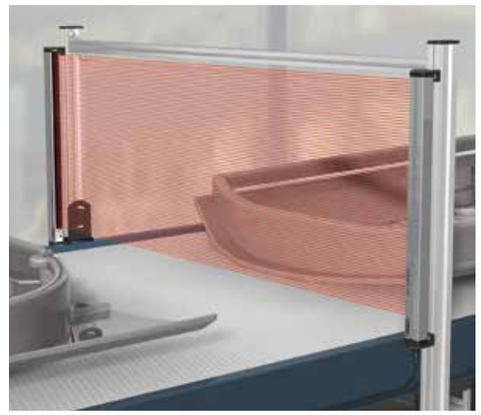
Solution

- To verify the number of holes on a small metal part, the iVu Plus TG Image Sensor with Multipoint Inspections can be configured for multiple regions of interest (ROIs).
- Inspection ensures holes exist and were punched in the correct place. If not, the sensor sends a fail output so the part is rejected.

iVu Series Vision Sensor

For detailed product information, see page 25.

Part Out and Removal



Challenge

Reliable detection of stamped metal panels is important as they are diverted to multiple removal stations. The parts may bounce on the conveyor or could be bent, so single-point sensors may not be sufficient.

Solution

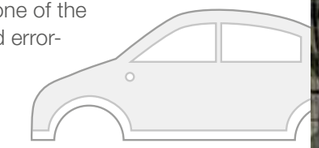
- Banner array sensors allow multi-point detection and are a cost-effective solution.
- EZ-ARRAY measuring arrays excel at high-speed, precise process monitoring and inspection, profiling and web-guiding applications with quick and simple installation.

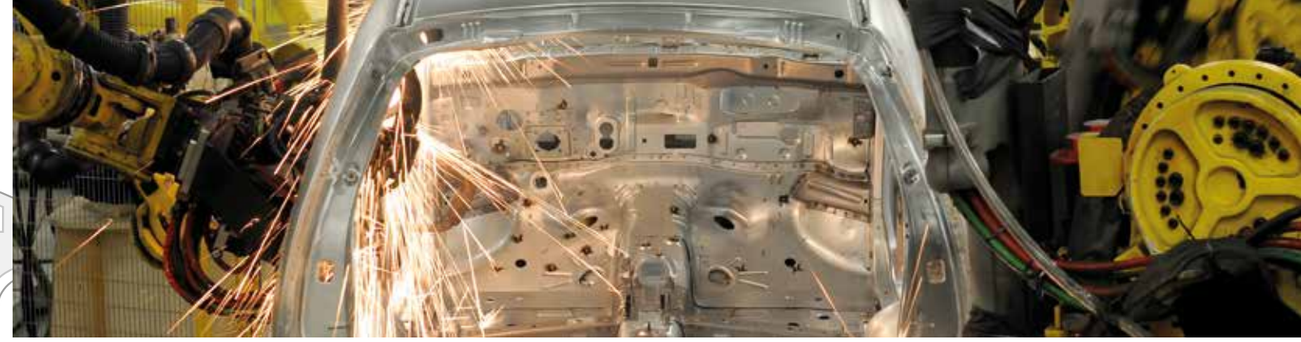
EZ-ARRAY Series Measuring Arrays

For detailed product information, see page 22.

Body Shop

Various components are combined to form a strong vehicle base: the body. The body shop is one of the vital production steps in automotive production. Banner offers sensors for reliable detection and error-proofing, as well as safety solutions that protect personnel and equipment.





Adhesive Bead Detection

Challenge

During the assembly of car doors, adhesive is applied along the perimeter of the outer panel. The outer and inner panels are joined together by a press. If too little adhesive is applied, the panels will not adhere correctly. If too much adhesive is applied, it may burst through the seams, requiring cleanup.

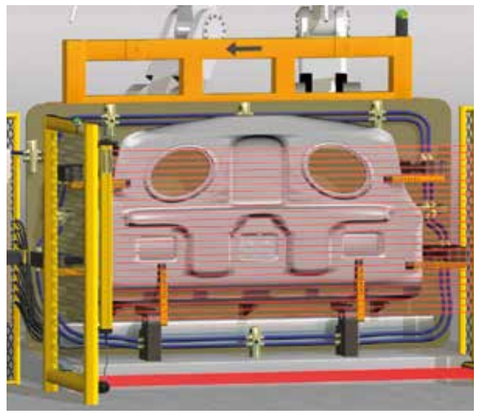
Solution

- A VE Series Smart Camera inspects each door panel for the presence and consistency of adhesive.
- The camera has a wide field of view and a 5 MP imager capable of detecting even slight inconsistencies in the amount of adhesive applied.

VE Series Smart Camera

For detailed product information, see page 25.

Manual Load Weld Cell



Challenge

In semi-automated operations, such as a robotic weld cell, operators must be protected from hazards.

Solution

- EZ-SCREEN® LS safety light curtains have no DIP switches, feature end-to-end sensing, and can be easily installed with automatic configuration.
- The XS26-2 is a flexible safety controller with an intuitive programming environment, and the ability to add up to eight I/O expansion modules.
- Banner's DUO-TOUCH Run Bar offers an ergonomic solution for cycle start that reduces hand and arm stress.

XS26 Series Safety Controller, EZ-SCREEN® LS Safety Light Curtains and DUO-TOUCH SG Series Two-Hand Control

For detailed product information, see page 26.

Part Presence and Position Verification

Challenge

Before the inner and outer panels of a car door can be joined together, additional components must be fastened into place. If components are missing or incorrectly placed during the process, the door panel will be unusable.

Solution

- An LTF series laser measurement sensor is an ideal solution for inspection applications where accuracy is critical and accessing the target can be challenging.

LTF Series Time of Flight Sensor

For detailed product information, see page 22.

Weld Tip Inspection

Challenge

In automated welding, it is important to maintain the overall quality of the welders to check for worn, improperly milled or missing welding caps. Bad welds cause rework or scrap of subassemblies or whole bodies.

Solution

- The R55F high contrast fibre sensor in combination with a stainless steel fibre block allows very accurate detection of both tips of a welding gun. Even small non-machined or oxidation spots can be detected within a single robot position stop.
- The inspection increases the welding spot quality, reduces the machine downtime and saves costs.

R55F Series Fibre Optic Amplifier

For detailed product information, see page 23.

Paint Shop

The automotive paint shop is a zero fault tolerance environment, and requires solutions to have high availability, energy efficiency, and reliability even in harsh conditions. Banner sensors and systems are designed to perform reliably in this demanding environment.

Light Tunnel for Surface Checking

Challenge

Verify paint quality with visual inspections. Fluorescent lighting often flickers, so uniform lighting is needed for better quality inspections and worker ergonomics.

Solution

- The Banner WLB92 LED light bar provides a bright and even light that allows operators to identify defects. Uniform illumination makes inspections easier, more reliable, and more ergonomic.
- Compared to fluorescent lights, the WLB92 consumes half the power and lasts over 5 times as long.
- The WLB92 also features adjustable brightness and the ability to cascade multiple lights together.

WLB92 Series Industrial LED Light Bar

For detailed product information, see page 32.

Vehicle Detection

Challenge

It can be difficult for many optical sensors to detect the wide range of colors and reflectivity of different vehicles.

Solution

- The Banner T30UX ultrasonic sensor with integrated temperature compensation is the right choice because it can detect objects of any color or reflectivity.
- Detection can be made even more precise using sensing window limits.

T30UX Series Ultrasonic Sensors

For detailed product information, see page 23.

Conveyor Link Inspection

Challenge

In a paint shop, a continuous conveyor link is crucial, especially in the oven. In this application, broken parts could cause 12+ hours of costly unplanned downtime.

Solution

- Vision sensors can detect a crack in the chain link early so that it can be repaired during scheduled maintenance.
- This installation uses two area lights on either side of the VE vision sensor. A crack can easily be distinguished from the normal plain gray surface.

VE Series Smart Camera

For detailed product information, see page 25.

Predictive Maintenance Monitoring

Challenge

In the paint shop are a lot of critical devices like pumps and drives which need to be checked frequently for proper operation.

Solution

- Banner's vibration and temperature sensor measures RMS velocity, in inches per second or millimeters per second, and temperature.
- By monitoring motors, pumps, compressors, fans, blowers, and gearboxes for increases in vibration, problems can be detected before they become too severe and cause damage or unplanned downtime.

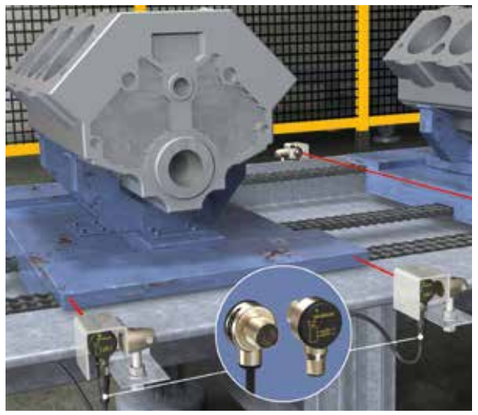
QM42VT Series Vibration & Temperature Sensors

For detailed product information, see page 24.

Powertrain

Today, the automotive powertrain requires a high variety of models, in combination with shorter life cycles, cost-efficient manufacturing and optimized logistic processes. Banner sensors and solutions enable process optimization, save costs, and improve quality.

Heavy-Duty Part Positioning



Challenge

In heavy-duty applications, sensors can be easily damaged during machine assembly, transport, maintenance and operation.

Solution

- The right choice in harsh environmental conditions is the TM18 sensor. The nickel-plated, die-cast zinc, IP69K rated design is the perfect solution for washdown applications and industrial environments where a compact and heavy-duty design is vital to prevent damage to the sensor.
- With a right angle shape, and an 18 mm threaded barrel mount, the TM18 readily fits into tight spaces.

TM18 Series Heavy-Duty Metal Right Angle Sensors

For detailed product information, see page 21.

Visual Management for Assembly

Challenge

To improve efficiency and accuracy in assembly applications, it is important to properly identify the next step in the process. Visual management for the assembler helps reduce errors.

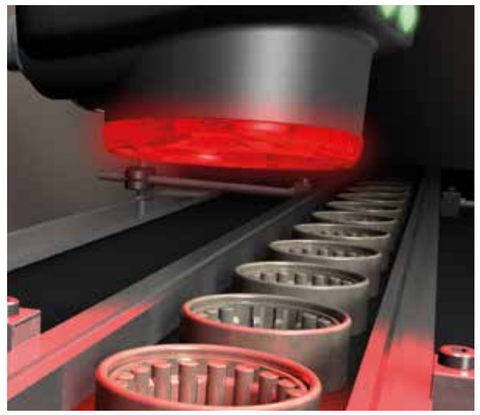
Solution

- The K50 Series pick-to-light sensors are a simple, easy-to-use error-proofing solution. The K50 sensors efficiently guide the assembler and reduce errors in the assembly process.
- The large 50 mm translucent domes have highly visible LEDs for clear indication.
- The ergonomic design of the touch buttons requires no physical pressure to operate, preventing stress on hands and wrists.

K50 Series Pick-to-Light Touch Buttons

For detailed product information, see page 31.

Bearing Inspection



Challenge

Roller bearings are used extensively in automobile manufacturing. If one or more of the rollers are missing, it increases the chance that a part will wear out prematurely.

Solution

- An iVu Series sensor configured for a Match inspection ensures that all the bearings are present for each component.
- If the sensor detects one or more missing bearings, it sends a fail output to the line, and the component is rejected.

iVu Series Vision Sensor

For detailed product information, see page 25.

Rubber Washer Detection

Challenge

To prevent defective products from being shipped, it is vital to error proof parts by ensuring all rubber washers are present before the next step in the assembly operation.

Solution

- Banner's Q4X versatile laser sensor is ideal for presence/absence detection even in challenging applications.
- The Q4X can detect duplicate rubber washers with its unique windowing capability while in foreground suppression mode.
- With a stainless steel housing, the Q4X is extremely durable and resists mechanical impact, vibrations and over tightening.

Q4X Series Laser Distance Measurement Sensor

For detailed product information, see page 20.

General Assembly

Automotive assembly lines require a flexible JIT/JIS flow of material mixed with continuous quality checking and tracking. Proper station lighting, light guided assembly and other error proofing is critical for success. Banner solutions enable customers to optimize processes and save costs.

Dark Tape Detection

Challenge

Dark tape on shiny metal parts can be difficult to detect for standard photoelectric sensors because the speed of the conveyor and parts, as well as the contrast difference.

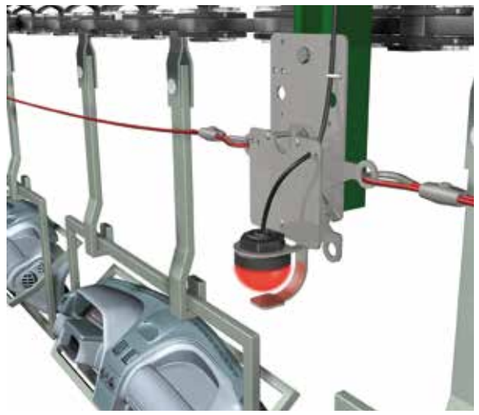
Solution

- The Q3X is Banner's rugged, versatile laser contrast sensor, ideal for applications that require fast detection. It can detect dark parts based on the taught contrast differences.
- Since the Q3X is laser-based, the sensor can be further away from the part and still reliably detect it.
- The rugged, nickel-plated zinc housing makes the Q3X suitable for many environments with cutting fluids and oils.

Q3X Series Laser Contrast Sensor

For detailed product information, see page 20.

Quality or Process Problem Detection



Challenge

Andon is part of a quality management system. The task is to provide a reliable, highly visible and cost-effective solution for an Andon rope pull application.

Solution

- The Banner rope pull bracket used with a K50 indicator offers flexible rope mounting and provides significant cost savings by eliminating old-fashion junction boxes.
- Optional hosting of a wireless node gives additional installation flexibility.

K50 Series Optical Pick-to-Light Sensors

For detailed product information, see page 30.

Temperature Monitoring

Challenge

All wires used in a defroster grid in rear window assemblies need to be monitored. Procedures to test the entire heating system are common. But to detect a single heating wire being broken can provide a real challenge.

Solution

- The cost effective, self-contained and easy-to-use T-GAGE M18T sensor is a robust temperature sensing and monitoring solution.
- One temperature sensor per defrost wire results in a comprehensive test procedure, resulting in a more reliable product.

M18T Series Non-Contact Temperature Sensors

For detailed product information, see page 24.

Operator Guidance for Assembly

Challenge

Today's assembly processes are based on continuous error proofing to achieve a target of zero defect. The Banner PTL (pick-to-light) sensors help operators pick parts accurately and efficiently.

Solution

- Visual indication helps ensure operators pick the correct parts and easily handle diverse part combinations.
- More reliable and efficient part picking saves time and increases the quality of assemblies.

PVD Part Verification Array Pick-to-Lights

For detailed product information, see page 31.

Tier One

Working in close partnership with Tier One automotive components suppliers around the world, Banner Engineering offers automation products that help improve production processes, implement lean strategies, reduce downtime and verify product quality.

Inspecting Small Connectors

Challenge

To work properly, the weight sensor connector on the underside of the seat cushion must be fully inserted. If it is not, air bags will not deploy appropriately in an accident.

Solution

- The LE550 is a cost-effective laser displacement sensor with exceptional resolution across its 100 mm to 1000 mm operating range.
- Deployed alongside the assembly line, the LE550 targets the back of the weight sensor connector. The visible beam and small spot size make the sensor easy to align and the LCD display greatly simplifies setup.

LE Series Laser Measurement Sensor

For detailed product information, see page 21.

High-Quality LED Lighting

Challenge

Finding a high-intensity, ultra-bright lighting solution for manufacturing can be challenging. Since multiple lights are required to properly illuminate areas on a conveyor, a simple mounting option to connect lights together is needed.

Solution

- Banner's WLB32 is a LED industrial light bar with easy mounting options, such as snap clips and a choice of magnetic or angle brackets.
- LED lights can easily be cascaded to properly illuminate the manufacturing line. Banner's LED lighting is an ideal replacement for conventional fluorescent lighting.

WLB32 Series Industrial LED Light Bars

For detailed product information, see page 33.

Detecting Poor Contrast Applications

Challenge

Verifying that components are present on automotive door panels is extremely important because if any part is missing, the quality of the final door assembly is adversely affected. It can be difficult for standard sensors to differentiate between presence and absence due to poor contrast.

Solution

- Banner's Q4X problem-solving laser sensor has no difficulty detecting dark targets on dark backgrounds when there is a height difference.
- The Q4X provides a reliable sensing solution and makes pass/fail judgments based on distance rather than color or reflectivity.

Q4X Series Laser Distance Measurement Sensor

For detailed product information, see page 20.

Barcode for Traceability

Challenge

Automotive suppliers are using barcodes for component traceability and quality control applications. Suppliers can store key information in a small code that's printed directly on the component. Before shipping, a supplier needs to verify that barcodes have been printed on the parts.

Solution

- The iVu BCR offers advanced bar code reading capabilities for traceability in a compact, rugged package with either an integrated touch screen or remote touch screen for easy setup and monitoring.
- It also features Ethernet communications and storage for multiple inspections for rapid product changeover.

iVu Series Vision Sensor

For detailed product information, see page 25.

Facility Management / Energy Saving

Energy saving is the key to conserving environmental resources and saving costs. Banner offers simple and effective solutions for energy saving.

Control Cabinet LED Illumination

Challenge

Work areas and enclosures need bright, even illumination for tasks such as component installation, maintenance and monitoring.

Solution

- The WLS28-2 LED strip lights provides even, bright, highly efficient illumination for industrial control cabinets and work cells with poor factory lighting conditions.
- The WLS28-2 LED light can be adjusted from 100% to 50% brightness to save energy costs when full brightness is not needed.
- The WLS27 LED strip lights are fully enclosed in a shatterproof copolyester shell to provide brilliant illumination for a broad range of applications in challenging and heavy-duty environments.

WLS27 and WLS28-2 Series LED Strip Lights

For detailed product information, see pages 34 and 35.

High-Quality LED Lights Improve Quality Inspection

Challenge

The most important part of lighting up an automotive environment for inspection purposes is to find a light source that provides consistent, extremely bright light.

Solution

- The energy-efficient WLB92 is easy to install and gives a consistent, bright light with minimal glare to inspect automotive parts. Increased lighting can improve worker productivity and reduce eye strain.
- The WLB92 is a high-quality LED light designed with an aesthetically-pleasing look, with an industrial construction for a rugged automotive environment.

WLB92 Series Industrial LED Light Bar

For detailed product information, see page 32.

Rain / Ground Water Retention

Challenge

In certain plants, rain or ground water may endanger the whole production. Therefore, the water level has to be monitored and pumps activated to evacuate water.

Solution

- The DXM Series Industrial Wireless Controllers can be used as Gateways to communicate the water level detected by Banner ultrasonic sensors from different drains and to activate distributed pumps.
- The DXM offers remote access with GSM communication. Avoiding digging cables into the ground generates huge savings.

DXM Series Industrial Wireless Controllers

For detailed product information, see page 27.

Energy Saving / Exhaust Ventilation

Challenge

High power drives used for roof exhaust ventilation provide savings potential by turning off the load when not used.

Solution

- Typical controls use hard wired motor starters that cannot be turned off between shifts and weekends because they are mounted on hard to reach places, such as the roof, for example.
- The PLC needs also field wiring with remote I/Os to motor starters. The Banner DX80 Wireless I/O solution saves installation time and operational costs allowing the ROI to be achieved within a short period.

DX80 Series Gateways and Nodes

For detailed product information, see page 27.

Industry 4.0 – IO-Link

Designed to facilitate communication between sensors/actuators from different manufacturers and higher-level systems, the fieldbus-independent IO-Link serial communication protocol offers a uniform standard that applies to all manufacturers.

5 Advantages of IO-Link

Standardized and Reduced Wiring

- IO-Link does not require any special or complicated wiring. IO-Link devices can be connected using the same cost-effective standard unshielded 3-wire cables as conventional discrete I/O.
- IO-Link supports a master-slave configuration with passive connection points, which further reduces wiring requirements.

Increased Data Availability

- Data availability is a powerful advantage of IO-Link: access to sensor-level data helps ensure the smooth operation of system components, streamlines device replacement, and enables optimized machine maintenance schedules.
- This wealth of valuable data made available through IO-Link is integral for the Industrial Internet of Things (IIoT) and Industry 4.0 initiatives.

Remote Configuration and Monitoring

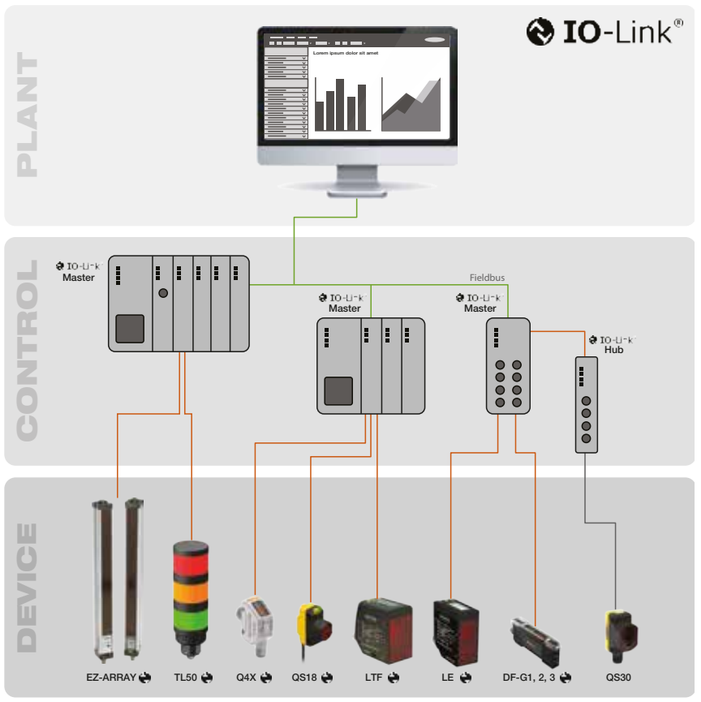
- With IO-Link, users can read and change device parameters through the control system software.
- IO-Link allows operators to dynamically change the sensor parameters from the control system as needed.
- The ability to monitor sensor outputs, receive real-time status alerts, and adjust settings from virtually anywhere allows users to identify and resolve problems that arise on the sensor level in a timely manner.

Simple Device Replacement

- IO-Link's data storage capability allows for automated parameter reassignment in case of device replacement.

Extended Diagnostics

- IO-Link provides users with visibility into errors and health status from each device.
- Extended diagnostics allow users to easily identify when a sensor is malfunctioning and diagnose the problem without shutting down the line or machine.



IO-Link Solutions

- EZ-ARRAY Measuring Arrays
- TL50 Tower Lights
- Q4X Laser Distance Sensors
- QS18 Clear Object Detection Sensors
- LTF Time-of-Flight Laser Sensors
- LE Laser Displacement Sensors
- DF-G Fiber Optic Amplifiers
- QS30 High-Performance Long-Range Sensors
- K50L2 Multicolor RGB Indicator Lights

Product Selection

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Q4X Laser Distance Measurement Sensor

IO-Link®

- Simple setup thanks to bright spot alignment, three push buttons and intuitive menus
- Four-digit display shows distance to target in mm
- FDA-grade stainless steel is suitable for IP69K washdown environments
- Add-on aperture lens kit (APG18S) made of borosilicate glass protects the sensor and lens, ensuring a long working life
- Five sensing modes in one device including detection of clear or reflective objects

Threaded	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 to 10 V Analog **I** = 4 to 20 mA Analog	**LAF** = Laser Adjustable-Field	**600** = 25-600 mm* **500** = 25-500 mm** **300** = 25-300 mm **100** = 25-100 mm * Only available in Dual Discrete with IO-Link models ** Not available in Dual Discrete with IO-Link models		**Q8** = Integral QD

FLush	Housing Style	Output	Mode	Range		Connector
Q4X	**F**	**N**	**LAF**	**310**	–	**Q8**
	F = Flush face	**N** = NPN Discrete **P** = PNP Discrete **K** = Dual Discrete with IO-Link **U** = 0 to 10 V Analog **I** = 4 to 20 mA Analog	**LAF** = Laser Adjustable-Field	**610** = 35-610 mm* **310** = 35-310 mm **110** = 35-110 mm * Only available in Dual Discrete with IO-Link models		**Q8** = Integral QD

Q3X Laser Contrast Sensor

- Solves contrast applications capturing up to 2,000 events per second
- Rugged metal, laser-marked housing for use in environments with chemical and oil exposure
- Three-digit display offers immediate feedback for easy setup and troubleshooting
- Bright output indicator provides high visibility of sensor operation
- Superior resistance to ambient light interference

Family	Housing Style	Output	Mode & Range		Connector
Q3X	**T**	**B**	**LD**	–	**Q8**
	T = 18 mm Threaded Barrel	**B** = Bipolar (NPN & PNP)	**LD** = Laser Diffuse, 300 mm **LD50** = Laser Diffuse, 50 mm (60 mm background suppression) **LD100** = Laser Diffuse, 100 mm (120 mm background suppression) **LD150** = Laser Diffuse, 150 mm (190 mm background suppression) **LD200** = Laser Diffuse, 200 mm (280 mm background suppression)		**Q8** = 5-Pin Integral QD

TM18 Heavy-Duty, Right Angle, Metal Sensors

- Robust die-cast metal sensors provide reliable sensing without adjustments
- Extremely bright LED red sensing beam for easy alignment
- Fixed-field models have enhanced immunity to fluorescent lights
- Polarized/fixed-field models have crosstalk avoidance so two sensors can be in close proximity
- More models are available; for more information, visit www.bannerengineering.com

Polarized Retroreflective TM18 – Visible Red LED				
NPN Models	**PNP Models**	**Range**	**Connection**	**Output Type**
TM18VN6LP	**TM18VP6LP**	5.5 m	2 m	LO/DO
TM18VN6LPQ8	**TM18VP6LPQ8**	5.5 m	4-Pin M12 QD	LO/DO
Fixed-Field TM18 – Visible Red LED				
TM18VN6FF25	**TM18VP6FF25**	25 mm	2 m	LO/DO
TM18VN6FF25Q8	**TM18VP6FF25Q8**	25 mm	4-Pin M12 QD	LO/DO
TM18VN6FF50	**TM18VP6FF50**	50 mm	2 m	LO/DO
TM18VN6FF50Q8	**TM18VP6FF50Q8**	50 mm	4-Pin M12 QD	LO/DO
TM18VN6FF100	**TM18VP6FF100**	100 mm	2 m	LO/DO
TM18VN6FF100Q8	**TM18VP6FF100Q8**	100 mm	4-Pin M12 QD	LO/DO

For 9 m cable, add suffix W/30 to the 2 m model number (example, TM18VN6LP W/30).
For a 4-Pin 150 mm M12 pigtail QD, add suffix Q5 to the 2 m model number (example, TM18VN6LPQ5).

LE Laser Measurement Sensor

IO-Link®

- The LE laser sensors are ready to measure right out of the box
- Easy adjustment with a two-line, eight-character intuitive display
- Great repeatability and accuracy for challenging targets, from metal to black rubber
- Visible class 2 laser for small spot size and simple alignment

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

LTF Time of Flight Sensor

- 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

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

EZ-ARRAY Measuring Arrays

- Two-piece light-screen design eliminates the need for a separate controller
- 5 mm beam spacing provides edge resolution of 2.5 mm
- High excess gain option for detecting opaque objects in single and double edge scan mode
- Seven zone LEDs provide instant alignment and beam blockage information
- Remote TEACH capable
- Rugged aluminum housing

Family	Array Length		Output (Receiver Only)	Communication (Receiver Only)	Connector
EA5E	**150**		**NI**	**XMOD**	**Q**
E = Emitter **R** = Receiver	**150** = 150 mm **300** = 300 mm **450** = 450 mm **600** = 600 mm **750** = 750 mm **900** = 900 mm	**1050** = 1050 mm **1200** = 1200 mm **1500** = 1500 mm **1800** = 1800 mm **2100** = 2100 mm **2400** = 2400 mm	**NI** = NPN Current 4 to 20 mA **NU** = NPN Voltage 0 to 10 V **PI** = PNP Current 4 to 20 mA **PU** = PNP Voltage 0 to 10 V	**XMOD** = Modbus **XK** = IO-Link	**Q** = 8-Pin M12 Modbus communication: receiver uses 5-Pin M12 IO-Link communication with splitter cable

Models with array lengths 1050 mm and longer ship with a center bracket and two end-cap brackets

T30UX Ultrasonic Sensors

- Built-in temperature compensation for high-accuracy across a wide range of ambient temperatures
- Resists harsh environments with rugged IP67 (NEMA 6) housing and fully encapsulated electronics
- Push-button and remote TEACH-mode programming with an external switch, computer or controller for added security and convenience

Models*	Range	Frequency	Connection	Response Time	Output
T30UXDA **T30UXDAQ8**	100 mm to 1 m	224 kHz	2 m 4-Pin M12 QD	45 ms	Discrete: NPN, PNP, NO, NC, Selectable
T30UXDB **T30UXDBQ8**	200 mm to 2 m	174 kHz	2 m 4-Pin M12 QD	92 ms	Discrete: NPN, PNP, NO, NC, Selectable
T30UXDC **T30UXDCQ8**	300 mm to 3 m	114 kHz	2 m 4-Pin M12 QD	135 ms	Discrete: NPN, PNP, NO, NC, Selectable
T30UXUA **T30UXUAQ8**	100 mm to 1 m	224 kHz	2 m 4-Pin M12 QD	Selectable 45 or 105 ms	Analog: 0 to 10 V dc
T30UXIA **T30UXIAQ8**	100 mm to 1 m	224 kHz	2 m 4-Pin M12 QD	Selectable 45 or 105 ms	Analog: 4 to 20 mA
T30UXUB **T30UXUBQ8**	200 mm to 2 m	174 kHz	2 m 4-Pin M12 QD	Selectable 92 or 222 ms	Analog: 0 to 10 V dc
T30UXIB **T30UXIBQ8**	200 mm to 2 m	174 kHz	2 m 4-Pin M12 QD	Selectable 92 or 222 ms	Analog: 4 to 20 mA
T30UXUC **T30UXUCQ8**	300 mm to 3 m	114 kHz	2 m 4-Pin M12 QD	Selectable 135 or 318 ms	Analog: 0 to 10 V dc
T30UXIC **T30UXICQ8**	300 mm to 3 m	114 kHz	2 m 4-Pin M12 QD	Selectable 135 or 318 ms	Analog: 4 to 20 mA

For 9 m cable, add suffix W/30 to the 2 m model number (example, T30UXDA W/30).
For a 4-Pin 150 mm M12 PUR pigtail QD, add suffix QPMA the 2 m model number (example, T30UXDAQPMA).
* Contact factory to request chemically resistant flange or fill-level control models.

R55F Fibre Optic Amplifier

- Delivers outstanding color contrast sensitivity
- Reliably detects 16 levels of grayscale at up to 10,000 actuations per second
- Available in two fiber types: economical plastic for repeated flexing and glass for harsh conditions

Suggested Models
R55FVQ, which offers best results with red LED (other colors available).
DBA13SMWTI3WV glass fiber assembly with integrated lens cleaning option, for simultaneous measurement of both weld tips on a weld gun.

M18T Non-Contact Temperature Sensors

- Senses temperature differences as small as 3 °C, on moving or still products
- Senses from 0 to 300 °C
- Allows threshold adjustment and real-time information display through a PC
- Requires no emitter or controller
- Uses remote or push-button programming
- Models with Enclosed Plastic face also available

Models	Sensing Face	D:S Ratio*	Output	Connection
M18TUP8	Integrated lens	8:1	0 to 10 V dc analog, plus PNP Alarm	2 m
M18TUP8Q				5-Pin M12 QD
M18TUP14	Germanium lens	14:1	0 to 10 V dc analog, plus PNP Alarm	2 m
M18TUP14Q				5-Pin M12 QD
M18TIP8	Integrated lens	8:1	4 to 20 mA analog, plus PNP Alarm	2 m
M18TIP8Q				5-Pin M12 QD
M18TIP14	Germanium lens	14:1	4 to 20 mA analog, plus PNP Alarm	2 m
M18TIP14Q				5-Pin M12 QD

For 9 m cable, add suffix W/30 to the 2 m model number (example, M18TUP8 W/30).
* For a sensor with an 8:1 D:S ratio, the sensor's spot size is a 1" diameter circle at a distance of 8".

QM42VT Vibration & Temperature 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
- Remote access to process data for the Industrial Internet of Things (IIoT)

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

Nodes with 1-Wire Serial Interface

Models	Description	Frequency
DX80N2Q45U	Q45 Wireless Node with integrated battery	2.4 GHz
DX80N9Q45U		900 MHz
DX80N2Q45VT	Q45 Vibration and Temperature Node, must be paired with QM42VT1 Vibration and Temperature Sensor	2.4 GHz
DX80N9Q45VT		900 MHz
DX80N2X1S-P6	1-wire Serial Performance Node with integrated battery	2.4 GHz
DX80N9X1S-P6		900 MHz
DX80N2X6S-P6	1-wire Serial Performance Node 10 to 30 V dc	2.4 GHz
DX80N9X6S-P6		900 MHz
DX80DR2M-H6	1-wire Serial Modbus MultiHop Slave with integrated battery	2.4 GHz
DX80DR9M-H6		900 MHz

VE Smart Camera

- Available in 5MP (2592 × 2048 pixels), 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

Family	Resolution	Imager	Ethernet Connection
VE	**205**	**G**	**1A**

Resolution
200 = WVGA, 752 x 480 pixels
201 = 1.3 MP, 1280 x 1024 pixels
202 = 2MP, 1600 x 1200 pixels
205 = 5MP, 2592 x 2048 pixels

Imager
G = Grayscale

Ethernet Connection
1A = M12, 8-Pin female

iVu Vision 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
- IVu Plus TG supports the ability to obtain results and command rapid product changeovers over TCP/IP, EtherNet/IP, Modbus/TCP protocols or Profinet and has the ability to store up to 30 inspections
- IVu BCR Plus models have Ethernet communication available and are capable of storing and controlling up to 30 inspections for fast product changeover

iVu TG iVu BCR	Touch Screen	Ring Light Color		Lens (mm)	
IVU2P	**TG**	**R**		**04**	

iVu TG / iVu BCR
IVU2P = TG: Match, Area, Blemish, Sort and Multi-tool with Ethernet and storage for 30 inspections
IVU2P = BCR: Reads 1D and 2D with Ethernet and storage for 30 inspections

Touch Screen
TG = Grayscale Integrated Touch Display
RG = Grayscale Remote Display
TB = Barcode Integrated Touch Display
RB = Barcode Remote Display
Remote display is required for set up and viewing of sensors with a remote touch screen

Ring Light Color
R = Red
B = Blue
G = Green
W = White
I = Infrared
6 = UV365
9 = UV395
XC = C-Mount*
X = No Ring Light
* Requires C-Mount lens

Lens (mm)
04 = 4.3
06 = 6
08 = 8
12 = 12
16 = 16
25 = 25
Blank = No lens (only C-Mount)

XS26 Expandable Safety Controller

- Easy to both program and install while providing scalable flexibility to meet your growing automation needs
- Allows up to eight expansion modules
- 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

XS26-2 Safety Controller, 24 V DC

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

Expansion Modules

Model (with screw terminals)	Description	Output Configuration
XS8si	8 Pin Safety input module	N/A
XS16si	16 Pin Safety input module	N/A
XS2so	Safety output module	2 dual channel PNP
XS4so	Solid-state safety output module	4 dual channel PNP
XS1ro	Safety relay output module	2 NO/1 NC
XS2ro	Safety relay output module	4 NO/2 NC

EZ-SCREEN® LS Safety Light Curtains

- Alignment indicators are highly visible, and intuitive diagnostics simplify setup, facilitate troubleshooting and streamline installation
- No blind zone design eliminates 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

Standard

SLL

(Non-Cascade) Cascadable models also available

System Type

P

E = Emitter only
R = Receiver only
P = Pair (Emitter and Receiver)

Resolution

14

14 = 14 mm
23 = 23 mm
40 = 40 mm

–

Defined Area

770

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*

P88

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)

DXM Industrial Wireless Controllers

- The DXM100 facilitates Ethernet connectivity and Industrial Internet of Things (IIoT) applications
- 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; email and text alerts
- Micro SD card for data logging
- 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

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

DX80 Gateways and Nodes

- Create point to multi point networks that distribute I/O over large areas
- Input and output types include discrete (dry contact, PNP/NPN), analog (0 to 10 V dc, 0 to 20 mA), temperature (thermocouple and RTD), and pulse counter
- Enhanced gateways and nodes offer increased range in the 900 MHz frequency band
- High density I/O capacity provides up to 12 discrete inputs or outputs or a mix of discrete and analog I/O
- Universal analog inputs allow current or voltage to be selected in the field

PM Series – Wire Replacement

An I/O radio network that combines long range line-of-sight coverage with ease of deployment and use. The PM2 Series has four sourcing discrete inputs, four sourcing discrete outputs, two analog inputs and two analog outputs in both the Gateway and the Node. Model example: DX80G2M6S-PM2.

Serial Data Radios

Sure Cross® MultiHop Serial Data Radios are wireless industrial communication devices used to extend the range of serial communication networks. Model example: DX80SR2M-H.

Ethernet Data Radios

Sure Cross® MultiHop Ethernet Data Radios are wireless industrial communication devices used to create point to multipoint configurations of wireless Ethernet networks. Model example: DX80ER2M-H.

Performance Series Gateways and Nodes

Create point-to-multi point networks that distribute I/O over large areas. Input and output types include discrete (dry contact, PNP/NPN), analog (0 to 10 V dc, 0 to 20 mA), temperature (thermocouple and RTD), and pulse counter. Model example: DX80G2M6S-P2.

K30L2 & K50L2 Multicolor RGB Indicator Lights

IO-Link®

- Bright, even indication in red, green, blue, yellow, cyan, magenta, and white
- Rugged IP66, IP67, and IP69K polycarbonate housing protects against impact and withstands high-pressure, high-temperature washdown to ensure reliable performance in challenging environments
- Simple wiring plan enables quick installation and allows users to consolidate controller outputs
- IO-Link enables full control of color, flashing, dimming, and advanced animations like rotation, strobing, 2-color display, 2-color rotation, 2-color flashing, and chase
- An optional audible alarm provides a distinct, loud notification of status (K50L2 models only)
- Laser marking is available

Family
K30L2

Material
Blank = Standard
F = FDA Grade

Color
RGB
RGB = Multicolor

Input
7
7 = 7 colors available in one unit

Connection
Q
Blank = 2 m Integral Cable
Q = M12 Integral QD*
QP = M12 Pigtail QD
* Integral QD not available in FDA-grade material

Family
K50L2

Material
Blank = Standard
F = FDA Grade

Color
RGB
RGB = Multicolor

Input
7
7 = 7 colors available in one unit
K = IO-Link

Audible Alarm
A1
Blank = No Audible
A1 = Audible
AL1 = Loud Audible
ALS = Sealed Audible
Audible models not available in FDA-grade material

Connection
Q
Blank = 2 m Integral Cable*
Q = M12 Integral QD**
QP = M12 Pigtail QD
* IO-Link models not available with integral cable
** Integral QD not available in FDA-grade material

K30 & K50 Illuminated Touch Buttons

- Ergonomic design requires no physical pressure to operate, preventing stress on hands and wrists
- Simple operation with the touch of a finger, hand or whole palm
- Easily actuated with bare hands or work gloves
- Rugged, fully encapsulated IP69K construction for high-pressure wash-down environments
- Models with either latching or momentary outputs
- One-, two- and three-color models available to solve a variety of applications
- Smart electric field sensing on second generation models provides excellent immunity to false triggering from water spray, detergents and other foreign materials
- Second generation models feature superior electrical noise immunity
- Laser marking is available

Multipurpose
K30
K30 = Domed
K50
K50 = Domed
K50C = Compact

Output State
A
A = Normally Open
R = Normally Closed

Input/Output
P
P = PNP
N = NPN

Activation Method
T2
T2 = Touch
T2F = Touch, FDA Grade

Color
1 2 3*
G **R** **Y**
G = Green
Y = Yellow
R = Red
B = Blue
W = White
T = Turquoise
O = Orange
V = Violet
M = Magenta
X = Not used
* K30: Third color option is only available in green, yellow, red, blue and white

Function
F2
F2 = Multifunction
Three inputs activate three colors. Color 3 overrides Colors 1 and 2, and Color 2 overrides Color 1. Touch changes output state.

Connector
Q
Blank = 2 m Integral Cable
Q = M12 Integral QD
QP = M12 Pigtail QD
T = 5-Screw Terminal (K30 only)
FDA Grade models only available with pigtail QD

Illuminated
K30
K30 = Domed
K50
K50 = Domed
K50C = Compact

Output State
A
A = Normally Open
R = Normally Closed

Output Function
L
Blank = Momentary
L = Latching

Output Type
B
B = Bipolar Output (NPN & PNP)

Activation Method
T2
T2 = Touch
T2F = Touch, FDA Grade

Color
(Not activated) (Activated)
G **R**
G = Green
Y = Yellow
R = Red
B = Blue
W = White
T = Turquoise
O = Orange
V = Violet
M = Magenta
X = Not used
The color of the indicator is determined by the non-activated or activated condition.

Function
H
H = Illuminated Buttons
Power activates Color 1. Touch changes bipolar output state and activates Color 2. Latch and momentary options.

Connector
Q
Blank = 2 m Integral Cable
Q = M12 Integral QD
QP = M12 Pigtail QD
T = 5-Screw Terminal (K30 only)
FDA Grade models only available with pigtail QD

K50 Optical Pick-to-Light Sensors

- The K50FF and K50LP use reliable photoelectric sensing for non-contact part-picking applications
- Photoelectric pick acknowledgment
- Fixed-field or polarized retroreflective depending on model
- Simple, one-piece, cost-effective installations
- Easily mounted on any type of tube rack or shelving
- Several logic functions available to customize the operation of the application and control system
- Models available with Modbus communication, to minimize the cabling and system programming requirements

One- or Two-Color	Output	Input	Sensing Mode	Range	Color: Job	Color: Sense	Function	Connector
K50	A	P	LP		G	X	D	Q

A = Normally Open
R = Normally Closed

P = PNP
N = NPN

LP = Polar Retro
FF = Fixed-Field

Blank = LP models
50 = 50 mm
100 = 100 mm

G = Green
Y = Yellow
R = Red
B = Blue
W = White
T = Turquoise
O = Orange
V = Violet
M = Magenta
X = Not used

Blank = 2 m Integral Cable
Q = M12 Integral QD
QP = M12 Pigtail QD
QPMA = PUR M12 Pigtail QD

1-Color Only
D = Input activates Color 1. Touch activates Output.
2-Color Only
C = Input activates Color 1. Touch activates Color 2 and Output.
E = Input activates Color 1. Touch activates Output. Touch with inactive input activates Color 2.

Three-Color	Output	Input	Sensing Mode	Range	Color	Function	Connector
K50	A	P	LP		G R Y	C3	QPMA

A = Normally Open*
R = Normally Closed**

* Polar Retro only available with Normally Closed input

** Fixed-Field only available with Normally Open input

P = PNP

LP = Polar Retro
FF = Fixed-Field

Blank = LP models
50 = 50 mm
100 = 100 mm

G = Green
Y = Yellow
R = Red
B = Blue
W = White
T = Turquoise
O = Orange
V = Violet
M = Magenta
X = Not used

Blank = 2 m Integral Cable
Q = M12 Integral QD
QP = M12 Pigtail QD
QPMA = PUR M12 Pigtail QD

C3 = Input activates Color 1. Touch with active input activates Color 3 and Output. Touch with inactive input activates Color 2 and Output.
C4 = Input activates Color 1. Touch with active input activates Color 3 and Output. Touch with inactive input activates Color 2 and Output for 5 seconds.

K30 & K50 Pick-to-Light Touch Buttons

- Ergonomic design requires no physical pressure to operate, preventing stress on hands and wrists
- Simple operation with the touch of a finger, hand or whole palm
- Easily actuated with bare hands or work gloves
- Rugged, fully encapsulated IP69K construction for high-pressure wash-down environments
- Models with either latching or momentary outputs
- Ideal for pick-to-light and call button applications in a variety of industries
- One-, two-, or three-color models available to solve a variety of applications
- Laser marking is available
- Models with one or two colors also available

Three-Color	Output	Input/Output	Activation Method	Color: Job	Color: Mispick	Color: Sense	Function	Connector
K30	A	P	T2	G	R	Y	C4	Q
K50								

K30 = Domed

K50 = Domed
K50C = Compact

A = Normally Open
R = Normally Closed

P = PNP
N = NPN

T2 = Touch
T2F = Touch, FDA Grade

G = Green
Y = Yellow
R = Red
B = Blue
W = White
T = Turquoise
O = Orange
V = Violet
M = Magenta
X = Not used

Blank = 2 m Integral Cable
Q = M12 Integral QD
QP = M12 Pigtail QD
QPMA = PUR M12 Pigtail QD

FDA Grade models only available with pigtail QD

C3 = Input activates Color 1. Touch with active input activates Color 3 and Output. Touch with inactive input activates Color 2 and Output.
C4 = Input activates Color 1. Touch with active input activates Color 3 and Output. Touch with inactive input activates Color 2 and Output for 5 seconds.

PVD Part Verification Array Pick-to-Lights

- Compact, one-piece solution useful in many part assembly, pick-to-light and error-proofing applications
- Innovative, low-profile design with auto-configuration feature for diffuse or retroreflective modes
- Ideal for bin picking in tube rack or shelving applications
- Green light for pick and red light for mispick with selectable control features

Family	Sensing Length	Connection
PVD	100	Q

100 = 100 mm
225 = 225 mm

Blank = 2 m Integral Cable
W/30 = 9 m Integral Cable
Q = 2 m M12 Pigtail QD

WLB92 Industrial 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

24 V DC	Cascadable	Color	Lighted Length (mm)	Control	Connector
WLB92	**X**		**550**	**PB**	**Q**
	X = Non Cascadable	○ **Blank** = Daylight White ○ **WW** = Warm White ● **R** = Red ● **G** = Green ● **B** = Blue ● **Y** = Yellow	**550** **1100**	**PB** = Switch and Dimming Knob Models include dimming knob for manual intensity control	**Blank** = 2 m Integral Cable (dc) **Q** = Integral 4-Pin M12 QD (dc)

100-277 V AC	Voltage	Cascadable	Color	Lighted Length (mm)	Control	Connector	Plug Type 1.8 m Cable
WLB92	**Z**	**C**		**550**	**PB**	**QM**	**B**
	Z = AC	**C** = Cascadable	○ **Blank** = Daylight White ○ **WW** = Warm White ● **R** = Red ● **G** = Green ● **B** = Blue ● **Y** = Yellow	**550** **1100**	**A** = 0-10 V Analog Dimming (Conduit CT models) **PB** = Switch and Dimming Knob (AC QM models)	**QM** = AC **CT** = Conduit Entry	

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.

Note: only needed for AC QM models

B = North & Central America, Japan, Taiwan
D = India, Sri Lanka, Nepal, Namibia
EF = France, Belgium, Slovakia, Tunisia, Germany, Austria, Netherlands, Spain, South 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)

DC Models Dimmable	Cascadable	Color	Lighted Length (mm)	Control	Connector
WLB92	**X**		**550**	**PWM**	**Q**
	X = Non Cascadable	○ **Blank** = Daylight White	**550** **1100**	**PWM** = Dimmable via Pulse Width Modulation	**Blank** = 2 m Integral Cable (dc) **Q** = Integral 4-Pin M12 QD (dc)

WLB32 Industrial LED Light Bars

- Banner's WLB32 is an ultra-bright LED fixture that features an even light output with no glare
- 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

Family	Power	Cascadable	Lighted Length (mm)	Shield	Control	Connector	Plug Type
WLB32		**C**	**285**		**PB**	**Q**	**B**
	Blank = DC **Z** = AC	**C** = Cascadable	**285** **570** **850** **1130**	**Blank** = No shield **E** = Eye shield	**Blank** = No Switch **M** = Motion Switch **PB** = Hi/Lo/OFF Switch	**Blank** = 2 m Integral Cable (dc) **Q** = Integral M12 QD (dc) **QM** = AC	

Note: only needed for AC QM models

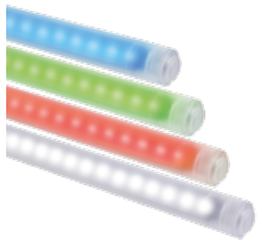
B = North & Central America, Japan, Taiwan
D = India, Sri Lanka, Nepal, Namibia
EF = France, Belgium, Slovakia, Tunisia, Germany, Austria, Netherlands, Spain, South Korea, Turkey, Poland
G = UK, Ireland, Cyprus, Malta, Malaysia, Singapore, Hong Kong, Vietnam
I = Australia, New Zealand, Papua New Guinea,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

WLS15 Low Profile Low Power LED Strip Light

- Low-profile, space-saving design
- Rugged, water-resistant design
- Daisy chain power to multiple lights
- Capability to dim lights using PWM input
- Low power draw for battery-operated and mobile applications

Family	Cascadable	Color	Length (mm)	Window	Construction	Connector
WLS15	**C**	**DW**	**0360**	**D**	**S**	**C2**
	C = Cascadable **X** = Non Cascadable	○ **DW** = Daylight White ○ **WW** = Warm White	**0220** **0360** **0500** **0640** **0920** **1200**	**D** = Diffused	**S** = Sealed (IP66, IP67)	**C2** = 2 m Integral **QP** = 150 mm Integral M12 QD **QS** = 150 mm Integral Cable with Deutsch DTM

WLS27 Multicolor LED Strip Light



- Sturdy internal aluminum housings, encased in shatterproof, UV-stabilized, copolyester shells
- Cylindrical shape design, ideal for laminar airflow applications
- Rugged, water-resistant IP66, IP67 and IP69K design
- Daisy chain power to multiple lights
- Automatic temperature protection built into the unit extends the product life
- Three- and five-color models with EZ-STATUS™ available in four lengths for combined machine lighting and indication
- Single color models also available

Multicolor	Cascadable	Color		Lighted Length (mm)	Window	Construction	Voltage	Connector
WLS27	X	WGRXX3	–	0285	D	S	24	Q
	C = Cascadable **X** = Non Cascadable			**0285** **0570** **0850** **1130**	**D** = Diffused Plastic	**S** = Sealed	**24** = 24 V	**Q** = Integral M12 QD

- **WGRXX3** = White, Green and Red with override control
- **WYRXX3** = White, Yellow and Red with override control
- **GYRXX3** = Green, Yellow and Red with override control
- **WGRYB5** = White, Green, Red, Yellow and Blue with binary control
- **WGRXX6** = White, Green and Red with I/O Block control
- **WYRXX6** = White, Yellow and Red with I/O Block control
- **GYRXX6** = Green, Yellow and Red with I/O Block control

Dual-Color	Cascadable	Colors (C) / Density (D)					Lighted Length (mm)	Window	Construction	Connector
		C1	D1	C2	D2					
WLS27	X	W		R	2	–	285	D	S	Q
	C = Cascadable **X** = Non Cascadable				**Density** **Blank** = 100% **2** = 50% **3** = 33%		**145** **710** **285** **850** **430** **990** **570** **1130**	**D** = Diffused Plastic	**S** = Sealed	**Q** = Integral M12 QD

Color
- **W** = Daylight White
- **WW** = Warm White
- **R** = Red
- **G** = Green
- **B** = Blue
- **Y** = Yellow

Dimmable	Cascadable	Color	Lighted Length (mm)	Window	Construction	Intensity Control	Connector
WLS27	X	W	285	D	S	PWM	Q
C = Cascadable **X** = Non Cascadable		**W** = Cool White	**145** **710** **285** **850** **430** **990** **570** **1130**	**D** = Diffused Plastic	**S** = Sealed	**PWM** = Dimmable	**Q** = Integral M12 QD

WLS28-2 Versatile, All-Purpose LED Strip Light

- Sturdy aluminum housings, shatterproof windows and a low-profile, space-saving design
- Enhanced light quality with bright, densely-spaced LEDs (8 color options available)
- Rugged, water-resistant IP69K models
- Magnetic mount options available for easy installation
- Can be cascaded end-to-end to minimize wiring

Dual-Color	Cascadable	Colors (C) / Density (D)					Lighted Length (mm)	Window	Construction	Power Switch	Connector
		C1	D1	C2	D2						
WLS28-2	X	W		R	2	–	285	D	X	PB	Q
	C = Cascadable **X** = Non Cascadable				**Density** **Blank** = 100% **2** = 50% **3** = 33%		**145** **710** **285** **850** **430** **990** **570** **1130**	**Blank** = Clear Plastic **D** = Diffused Plastic **L25** = 25° Lensed Window	**S** = Sealed **X** = Not Sealed Sealed models not available with ON/OFF Switch (PB)	**Blank** = None **PB** = Color 1/OFF/ Color 2	**Blank** = 2 m Integral Cable **Q** = Integral M12 QD

Color
- **W** = Daylight White
- **WW** = Warm White
- **R** = Red
- **G** = Green
- **B** = Blue
- **Y** = Yellow

Single-Color	Cascadable	LED Color	Lighted Length (mm)	Window	Construction	Control	Connector
WLS28-2	X	W	145	D	X		Q
C = Cascadable **X** = Non Cascadable		**W** = Cool White **WW** = Warm White **R** = Red **G** = Green **B** = Blue **Y** = Yellow	**145** **710** **285** **850** **430** **990** **570** **1130**	**Blank** = Clear Plastic **D** = Diffused Plastic **L25** = 25° Lensed Window	**S** = Sealed **X** = Not Sealed Sealed models not available with ON/OFF Switch (PB) or Motion Switch (M)	**Blank** = None **M** = Motion Switch **PB** = Hi/Lo/OFF Switch	**Blank** = 2 m Integral Cable **Q** = Integral M12 QD

Dimmable	Cascadable	Color	Lighted Length (mm)	Window	Construction	Intensity Control	Connector
WLS28-2	C	W	145		X	PWM	Q
C = Cascadable **X** = Non Cascadable		**W** = Cool White	**145** **710** **285** **850** **430** **990** **570** **1130**	**Blank** = Clear Plastic **D** = Diffused Plastic **L25** = 25° Lensed Window	**S** = Sealed* **X** = Not Sealed	**PWM** = Dimmable	**Blank** = 2 m Integral Cable **Q** = Integral M12 QD

* Sealed models not available with ON/OFF Switch (PB)

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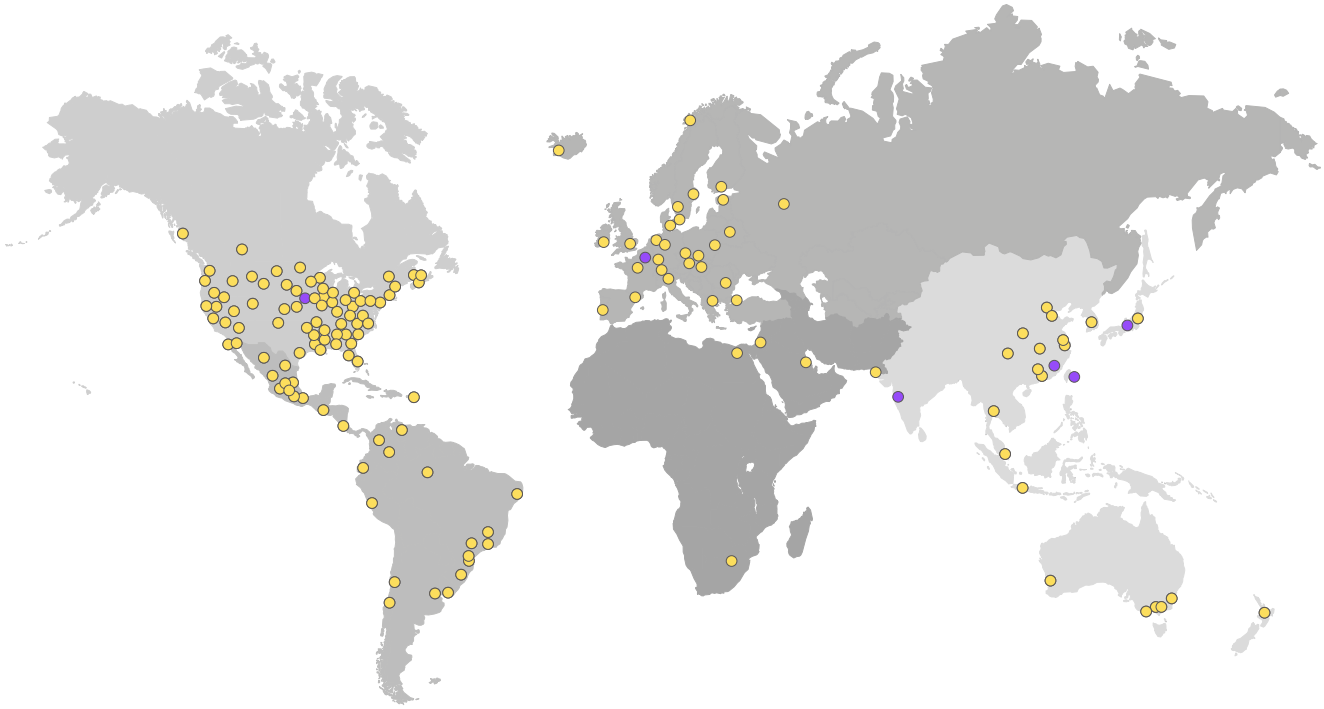

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