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Measurement & Inspection page 292

Light Gauging page 295

Light gauging sensors use lasers to deliver precise, long-distance sensing at the speed of light.

Ultrasonic page 308

Because ultrasonic sensors use sound waves rather than light, they are ideal for sensing uneven surfaces, liquids, clear objects and objects in dirty environments.

Measuring Arrays page 340

Using an array of closely spaced light beams, measuring light screens are designed for profiling, inspections and process monitoring.

Radar page 354

Radar sensors use Frequency Modulated Continuous Wave (FMCW) radar to reliably detect moving or stationary targets, including cars, trains, trucks and cargo in extreme weather conditions.

Vision page 359

iVu Image Sensors page 364

Touch screen image sensors delivers superior inspection performance faster and easier; no PC or external controller required.

*Presence*Plus® Vision Sensors page 370

Full-featured vision sensors with a complete suite of location, inspection, analysis and geometric tools; all can be used simultaneously for inspecting multiple features and solving complex applications.

Lenses page 381

Standard, high-performance or megapixel C-mount and Microvideo lenses provide enhanced sensor performance.

Lighting page 413

Specialized lighting creates all-important contrast between the feature of interest and its background.

Wireless page 383

The Banner SureCross Wireless System is an industrial wireless I/O network that can operate in extreme environments while eliminating the need for costly wiring runs.

Lighting & Indicators page 403

Task Lights page 404

Task Lights provide a variety of sizes of bright and even illumination for enclosures, area lighting, machine lighting and control panels.

Vision Lights page 413

Banner offers a wide selection of high-intensity LED lights with built-in current and strobe control. A variety of specialty lights are available, including fluorescent lights. A complete selection of polarizing filter kits, colored filters and lighting diffusers are offered to improve lighting quality.

Indicators page 427

EZ-LIGHT indicators provide real-time operational indication for workers and supervisors. Thirteen styles/housings include tower and column lights, segmented displays, daylight visible for outdoor applications, and dome, T-style and barrel housing.

Actuators page 443

Actuators help manufacturers reduce the risk of error in the assembly process, boosting product quality and reducing cost.

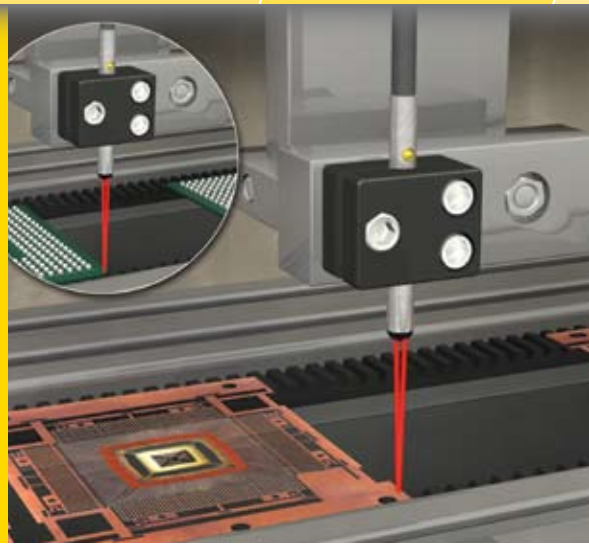
More on next page

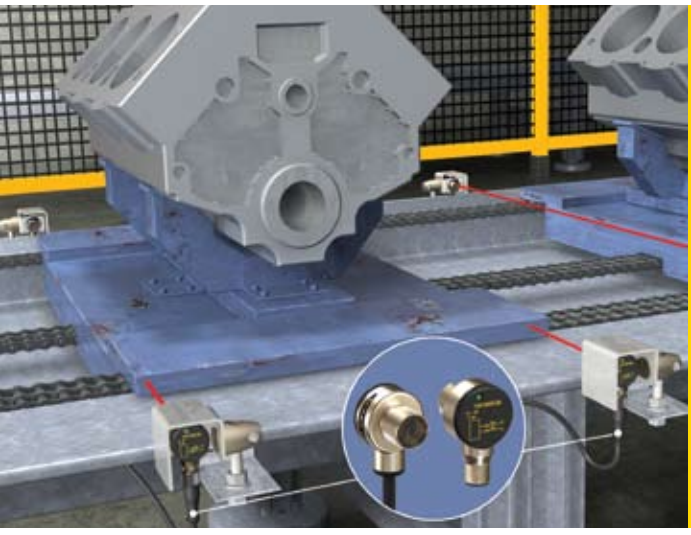
What's New!

VSM
Heavy-Duty Metal Sensors

- Tough, 300 series stainless steel body with sapphire lens withstands a wide variety of chemicals and cutting fluids
- Tiny sensors are available as small as a 4 mm barrel (about the size of a single optical fiber assembly)
- Economical, self-contained sensors are available in convergent or opposed sensing modes; no separate amplifier required
- Well focused, narrow beam allows the entire sensor to be recessed into fixtures
- Smooth, stainless steel barrel is perfect for hygienic applications that require routine cleaning

See page 74





TM18
Right-Angle Barrel-Mount Sensors

- Heavy-duty, die-cast metal housing with integral metal QD prevents sensor damage during machine assembly, transport, maintenance and operation
- Compact, right-angle T-style housing with 18 mm threaded lens mounts easily in tight places for added sensor protection
- All models have a visible red sensing beam for easy sensor alignment
- Completely epoxy-encapsulated electronics deliver superior durability, especially in harsh sensing environments
- Sensors rated IP69K for resistance to intermittent high-pressure washdown
- Sensors have enhanced immunity to fluorescent light and sensor crosstalk

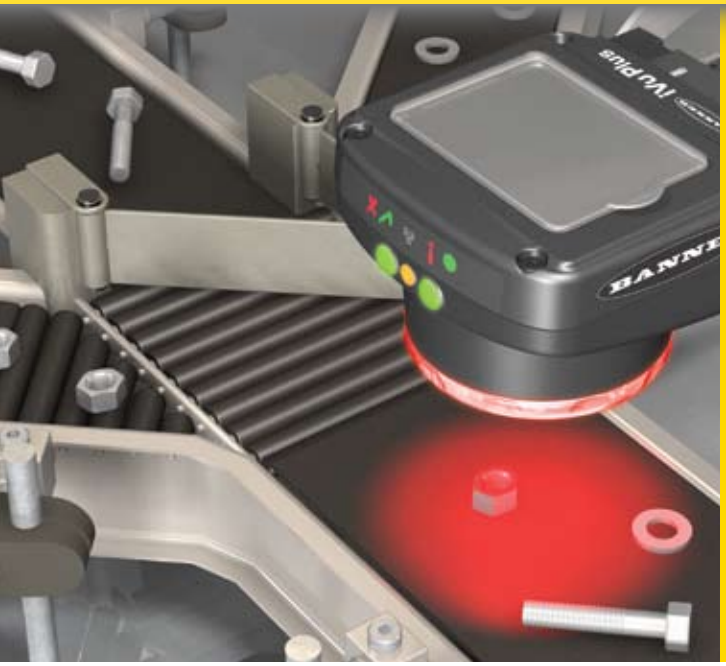
See page 140

L-GAGE® LH
High-Precision Laser Sensors

- Extremely accurate, robust and self-contained laser displacement sensing using a 1024 pixel CMOS linear imager
- Reliable and accurate measurement results on real world targets, such as machined metal, wood, ceramic, paper and painted targets
- Non-contact precise measurement on moving processes, hot parts, machined parts, and soft or sticky parts
- Two sensors self-synchronize for thickness measurements and thickness calculation within the sensors; no external controller required
- Serial communication for use of up to 6 sensors in multi-track or process control applications
- Dedicated software for sensor setup and performance monitoring
- Precise laser spot for easy alignment to the target
- Target displacement or thickness measurement with high-resolution 4-20 mA or RS-485 serial communication outputs
- Automatic laser power and measurement rate control for reliable measurement under changing or challenging target condition

See page 303

What's New!



iVu Plus TG and iVu Plus BCR

- No external PC required to configure or operate sensor
- Ethernet capabilities to control and communicate with the sensor
- Multiple stored inspections
- Recognize and sort up to ten different patterns in the same inspection
- Compact, rugged IP67-rated housing is available with or without a variety of integrated ring lights—red, blue, white, green and infrared
- One-piece integrated LCD and two-piece with remote LCD models

See page 364

TL50 CL50

EZ-LIGHT™ IP67-Rated Audible Indicator Lights

- TL50 Tower Lights with up to 4 colors in one housing
- Column Lights with 1, 2 or 3 colors
- Adjustable audible intensity to meet any environmental requirements
- A choice of black or gray housing (TL50 & CL50) and high-brightness LEDs (TL50)
- 30 mm threaded base for direct cabinet mounting with a single drilled hole

See page 428

EZ-LIGHT™ K80 Call Light

- Illuminated dome provides easy-to-see call for assistance indication
- Battery-powered light is ideal in locations where access to power is limited or unavailable
- Pre-assembled housing and multiple mounting options make the indicator light cost-effective and easy-to-install
- Large, red 50 mm dome is visible from 180 degrees
- Flashing red notification signal ensures part bins are refilled before supplies are gone, allowing line operators to sustain production

See page 439

What's New!

WLS28 Work Light Strip

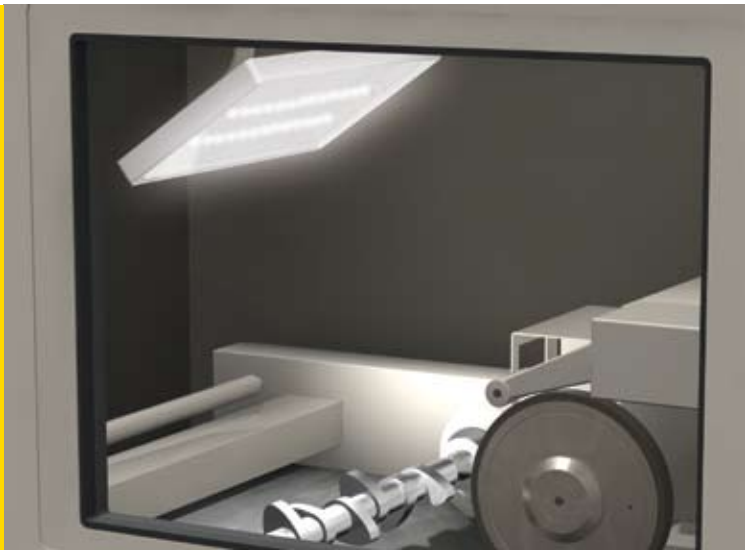
- Low-profile, 28 mm wide housing for use inside or under any industrial control cabinet or in work stations
- White LED lights in 145 to 1130 mm lighted lengths
- Cascade models for connecting multiple lights end-to-end, minimizing wiring
- High-power LEDs for superior illumination with an even pattern of light and no shadows
- Extremely long-lasting LED technology for >50,000 hours of continuous working life
- Low power consumption of less than 9 watts per foot

See page 407

WLA Area Work Light

- Solid-state LED light for area and machine lighting
- White LED lights in four sizes
- High-power LEDs for superior illumination with and even pattern of light and no shadows
- Extremely long-lasting LED technology for >50,000 hours of continuous working life
- Rugged, sealed thermoplastic housing; IP69K rated

See page 410



ED1G Enabling Devices

- Handheld grip-style switch typically used for manual control of machine functions including visual observations, minor adjustments, troubleshooting, calibration, etc.
- Enabling switch provides the three-position functionality (OFF-ON-OFF) required for manual control of a machine, including enabling and hold-to-run applications
- Safety function is provided when the user squeezes or releases the handlegrip enabling switch
- Suited for use as an enabling device for robotic cells
- Optional momentary push-button switch (depending on model) can provide hold-to-run, reset or jogging/inching functions

See page 615

Selection Guide

Miniature

						
Series	**WORLD-BEAM® Q12**	**M12**	**T8**	**S12/SB12T**	
Catalog Page	60	64	68	71	
Description	Miniature side-mount sensors	12 mm threaded barrel-mount sensor with visible red sensing beam	Right-angle barrel-mount sensor for small areas	Opposed-mode barrel-mount sensors	
Maximum Sensing Range	**Opposed:** 2 m **Retro Non-Polar:** 1.5 m **Retro Polarized:** 1 m **Fixed-Field:** 50 mm	**Opposed:** 5 m **Retro Non-Polar:** 2.5 m **Retro Polarized:** 1.5 m **Diffuse:** 400 mm **Fixed-field:** 75 mm	**Opposed:** 2 m **Diffuse:** 100 mm	**Opposed:** 15 m	
Dimensions (h x w x d)	23 x 8 x 12 mm	ø 12 x 67.5 mm	19 x 16 x 16 mm	**SB12:** ø 16 x 31 mm **S12:** ø 12 x 64 mm	
Housing Material	Thermoplastic elastomer	Nickel-plated brass	ABS	ABS	
Protection Rating	IP67	IP67; NEMA 6P, IP68	IP67; NEMA 6	**SB12:** IP65 **SB12T:** IP67 **S12:** IP67; NEMA 6P	
Operating Temperature	-20° to +55° C	-20° to +60° C	-20° to +55° C	**SB12:** -20° to +50° C **S12:** -40° to +70° C	
Power Supply	10 to 30V dc	10 to 30V dc	10 to 30V dc	10 to 30V dc	
Outputs	Bipolar NPN/PNP, PNP, NPN	Solid-state	Solid-state	Solid-state	
Output Response Time	**Opposed:** 1.3 ms ON/900 µs OFF **All others:** 700 µs ON/OFF	**Opposed:** 625 µs ON/375 µs OFF **All others:** 500 µs ON/OFF	1 ms ON/0.5 ms OFF	**SB12:** 2.5 ms ON; 1.75 ms OFF **S12:** 3.0 ms ON; 1.5 ms OFF	
Adjustments	—	—	—	—	

Miniature

	VSM	VS1	VS2	VS3
				
	74	**78**	**81**	**84**
	Tiny, heavy-duty metal sensors	Miniature, convergent-mode sensor	Ultra-thin miniature sensor for confined flush-mounting	Miniature sensor with advanced optics and coaxial retroreflective models
	Opposed: 250 mm **Convergent:** 90 mm	**Convergent:** 15 mm focus	**Opposed:** 3 m **Convergent:** 30 mm	250 mm
	VSM4: ø 4 x 36.8 mm **VSM5:** ø 5 x 36.8 mm **VSMQ:** 40 x 5 mm	26 x 8 x 12 mm	25 x 12 x 4 mm	26 x 9 x 16 mm
	Stainless steel	ABS	ABS	ABS
	IP67	IP54; NEMA 3	IP67; NEMA 6	IP67; NEMA 6
	0° to +55° C	-20° to +55° C	-20° to +55° C	-20° to +55° C
	10 to 30V dc	10 to 30V dc	10 to 30V dc	10 to 30V dc
	Solid-state	Solid-state	Solid-state	Solid-state
	2.5 ms	1 ms ON/OFF	**Opposed:** 1 ms ON/0.5 ms OFF **Convergent:** 1 ms ON/OFF	1 ms ON/OFF
	—	—	—	—

Selection Guide

Compact

Series	WORLD-BEAM® QS18	WORLD-BEAM® Q20	MINI-BEAM®	
Catalog Page	**88**	**103**	**108**	
Description	Right-angle barrel- and side-mount senors	Side-mount rectangular sensors	Comprehensive family of Photoelectric sensors	
Maximum Sensing Range	**Opposed:** 20 m **Laser Emitter:**15 m **Retro Non-Polarized:** 6.5 m **Retro Polarized:** 3.5 m **Laser Retro Polarized:** 10 m **Diffuse:** 1 m **Laser Diffuse:** 300 mm **Convergent:** 43 mm **Adjustable-Field:** 300 mm **Laser Adjustable-Field:** 250 mm **Fixed-Field:** 100 mm **Ultrasonic:** 500 mm **Glass & Plastic fiber optic:** depends on fiber used	**Opposed:** 20 m **Retro Polarized:** 4 m **Retro Non-Polar:** 6 m **Diffuse:** 1500 mm **Fixed-Field:** 100 mm	**Opposed:** 30 m **Retro Non-Polarized:** 5 m **Retro Polarized:** 3 m **Diffuse:** 380 mm **Divergent:** 130 mm **Convergent:** 49 mm **Glass & Plastic fiber optic:** depends on fiber used	
Dimensions (h x w x d)	35 x 15 x 31 mm	32 x 12 x 20 mm	Depends on model (see page 108)	
Housing Material	ABS	ABS	PBT polyester	
Protection Rating	IP67; NEMA 6	IP67; NEMA 6	IP67; NEMA 4X	
Operating Temperature	-20° to +70° C (most models)	-20° to +60° C	**NAMUR:** -40° to +70° C **All others:** -20° to +70° C	
Power Supply	10 to 30V dc, 20 to 140V ac/dc, or 20 to 270V ac/dc	10 to 30V dc	10 to 30V dc, 24 to 240V ac or 5 to 15V dc (NAMUR)	
Outputs	Solid-state, P-MOSFET, N-MOSFET	Solid-state	**DC & *Expert:*** Bipolar NPN/PNP **AC:** SPST SCR solid-state **NAMUR:** Constant current	
Output Response Time	Depends on model	**Opposed:** 1 ms ON/600 µs OFF **All others:** 800 µs ON/OFF	Depends on model	
Adjustments	Depends on sensing mode	Depends on sensing mode	Depends on model	

Compact

	S18 & M18	T18	TM18	Q25
				
	127	**134**	**140**	**144**
	EZ-BEAM®-style 18 mm barrel-mount sensor in thermoplastic or stainless steel	EZ-BEAM®-style right-angle barrel-mount sensor	Heavy-duty, right-angle barrel-mount sensor	EZ-BEAM®-style right-angle base-mount sensor
	Opposed: 20 m **Retro Polarized:** 2 m **Retro Non-Polar:** 2 m **Diffuse:** 300 mm **Fixed-Field:** 100 mm	**Opposed:** 20 m **Retro Polarized:** 2 m **Retro Non-Polar:** 2 m **Diffuse DC:** 500 mm **Diffuse AC:** 300 mm **Fixed-Field:** 100 mm	**Opposed:** 20 m **Retro Polarized:** 5.5 m **Fixed-Field:** 100 mm	**Opposed:** 20 m **Retro Polarized:** 2 m **Fixed-Field:** 100 mm
	DC: ø 18 x 59 mm **AC:** ø 18 x 85 mm	**DC:** 42 x 30 x 30 mm **AC:** 52 x 30 x 30 mm	41 x 30 x 30 mm	50 x 25 x 30 mm
	S18: PBT polyester **M18:** Stainless steel	PBT polyester	Zinc die-cast	PBT polyester
	IP67; NEMA 6P **QD models:** IP69K per DIN 40050-9	IP67; NEMA 6P **QD models:** IP69K per DIN 40050-9	IP67 or IP69K	IP67; NEMA 6P **QD models:** IP69K per DIN 40050-9
	-40° to +70° C	-40° to +70° C	-40° to +70° C	-40° to +70° C
	10 to 30V dc or 20 to 250V ac	10 to 30V dc or 20 to 250V ac	10 to 30V dc	10 to 30V dc or 20 to 250V ac
	Solid-state	Solid-state	Solid-state	Solid-state
	Depends on model	Depends on model	Depends on model	Depends on model
	—	Depends on sensing mode	—	—

Selection Guide

Midsize

				
Series	**WORLD-BEAM® QS30**	**S30**	**SM30/SMI30**	
Catalog Page	**150**	**161**	**166**	
Description	Midsize right-angle barrel- and side-mount sensors	EZ-BEAM®-style 30 mm barrel-mount sensors	Harsh-duty or intrinsically safe opposed-mode sensor with 30 mm threaded barrel	
Maximum Sensing Range	**Opposed:** 60 m **Opposed High Power:** 213 m **Opposed Water:** 8 m **Retro Polarized:** 8 m **Retro Non-Polarized:** 12 m **Laser Retro Polar:** 18 m **Clear Object:** 2 m **Diffuse:** 1 m **Laser Diffuse:** 800 mm **Adjustable-Field:** 600 mm **Fixed-Field:** 600 mm	**Opposed:** 60 m **Retro Polarized:** 6 m **Fixed-Field:** 600 mm	**SM30:** 200 m **SMI30:** 140 m	
Dimensions (h x w x d)	44 x 22 x 35 mm or 44 x 22 x 52 mm	**DC:** ø 30 x 69 mm **AC:** ø 30 x 81 mm	ø 30 x 102 mm	
Housing Material	PC/ABS (most models)	PBT polyester	PBT polyester or stainless steel	
Protection Rating	IP67; NEMA 6 (most models)	NEMA 6P; IP67 **QD models:** IP69K per DIN 40050-9	IP67; NEMA 6P	
Operating Temperature	-20° to +70° C (most models)	-40° to +70° C	-40° to +70° C	
Power Supply	10 to 30V dc, 12 to 250V dc or 24 to 250V ac	10 to 30V dc or 20 to 250V ac	10 to 30V dc or 24 to 240V ac	
Outputs	**DC:** Bipolar NPN/PNP **AC/DC:** SPDT e/m relay	Solid-state	**DC:** Bi-Modal™ (NPN or PNP) **AC:** SPST solid-state **SMI:** NPN	
Output Response Time	Depends on model	Depends on model	10 ms ON/OFF	
Adjustments	Depends on model	—	—	

				Midsize
				
	T30	**Q40**	**PicoDot®**	**QM42 & QMT42**
	170	**175**	**179**	**183**
	EZ-BEAM®-style right-angle barrel-mount sensors	EZ-BEAM®-style right-angle base-mount sensors	Compact laser for precise position detection, inspection and counting	Rugged sensors in die-cast housing with a range of sensing modes
	Opposed: 60 m **Retro Polarized:** 6 m **Fixed-Field:** 600 mm	**Opposed:** 60 m **Retro Polarized:** 6 m **Fixed-Field:** 600 mm	**Laser Convergent:** 305 mm **Laser Retro Polarized:** 10.6 m	**Opposed:** 10 m **Retro Polarized:** 3 m **Diffuse (LR):** 6 m **Diffuse (SR):** 400 mm **Adjustable-Field:** 400 mm **Fixed-Field:** 2 m **Plastic fiber optics:** depends on fiber used
	52 x 40 x 45 mm	70 x 40 x 46 mm	**PD45**: 41 x 13 x 46 mm **PD49**: 43 x 15 x 49 mm	**QM42:** 42 x 13 x 42 mm **QMT42:** 58 x 18 x 42 mm
	PBT polyester	PBT polyester	ABS/polycarbonate	Zinc alloy
	NEMA 6P; IP67 **QD models:** IP69K per DIN 40050-9	NEMA 6P; IP67 **QD models:** IP69K per DIN 40050-9	**PD45**: IP54; NEMA 3 **PD49**: IP67; NEMA 6	IP67; NEMA 6
	-40° to +70° C	-40° to +70° C	-10° to +45° C	**LR models:** -20° to +55° C **SR models:** -20° to +70° C
	10 to 30V dc or 20 to 250V ac	10 to 30V dc or 20 to 250V ac	10 to 30V dc	10 to 30V dc
	Solid-state	Solid-state	Solid-state	Solid-state
	Depends on model	Depends on model	200 µs ON/OFF	Depends on model
	—	—	12-turn Sensitivity (Gain) adjustment	Depends on model

Selection Guide

Fullsize

			
Series	**Q45**	**OMNI-BEAM™**	**Q60**
Catalog Page	**190**	**207**	**217**
Description	Advanced one-piece, rugged sensor with outstanding optical performance	Modular, limit-switch style, field-programmable sensor	Laser or LED sensor for low reflectivity targets, regardless of background
Maximum Sensing Range	**Opposed:** 60 m **Retro Laser:** 70 m **Retro Non-Polar:** 9 m **Retro Polarized:** 6 m **Diffuse:** 3 m **Convergent:** 100 mm **Glass & Plastic fiber optic:** depends on fiber used	**Opposed:** 45 m **Retro Non-Polar:** 9 m **Retro Polarized:** 4.5 m **Retro Clear Object:** 4 m **Diffuse:** 2 m **Convergent:** 38 mm **Glass & Plastic fiber optic:** depends on fiber used	**Adjustable-Field:** 2 m
Dimensions (h x w x d)	88 x 45 x 55 mm	**DC:** 76 x 45 x 55 mm **AC:** 99 x 45 x 55 mm	75 x 25 x 60 mm
Housing Material	PBT polyester	PBT polyester	ABS/Polycarbonate
Protection Rating	IP67; NEMA 6P	IP66; NEMA 4	IP67; NEMA 6
Operating Temperature	**DC:** -40° to +70° C **AC:** -40° to +70° C **AC/DC:** -25° to +55° C	-40° to +70° C	-20° to +55° C (most models)
Power Supply	10 to 30V dc, 90 to 250V ac, 24 to 250V ac, 12 to 250V dc or 5 to 15V dc (NAMUR)	10 to 30V dc, 105 to 130V ac or 210 to 250V ac	10 to 30V dc, 12 to 250V dc or 24 to 250V ac
Outputs	**DC:** Bipolar NPN/PNP **AC:** SPST or SPDT Relay **NAMUR:** Constant current	**DC:** Bi-Modal™ **AC:** SPST relay	**DC:** Bipolar NPN/PNP **AC/DC:** SPST or SPDT Relay
Output Response Time	Depends on model	Depends on model	Depends on model
Adjustments	LO/DO switch, sensitivity adjustment control	Field-programmable for 4 operating parameters	2 momentary push buttons/ remote program wire

Fiber Optic Sensors			
			
Series	**D10**	**D12**	**R55F**
Catalog Page	**226**	**235**	**240**
Description	High-performance, low-contrast sensor with numeric or bargraph display	Versatile, high-power sensor with bargraph display	Fiber optic sensor for outstanding color contrast sensitivity
Maximum Sensing Range	Range varies with power level/speed selection and with fiber optics used	Range varies depending on sensing mode and fiber optics used	Range varies depending on sensing mode and fiber optics used
Dimensions (h x w x d)	36 x 10 x 68 mm	**Plastic Fibers:** 30 x 12 x 64 mm **Glass Fibers:** 30 x 12 x 70 mm	25 x 30 x 85 mm
Housing Material	ABS/Polycarbonate	ABS	ABS/Polycarbonate
Protection Rating	IP50; NEMA 1	IP11; NEMA 2	IP67; NEMA 6
Operating Temperature	-20° to +55° C, depending on model	-40° to +70° C or -20° to +70° C, depending on model	-10° to +55° C
Power Supply	10 to 30V dc, 12 to 30V dc, 12 to 24V dc or 15 to 24V dc	10 to 30V dc	10 to 30V dc
Outputs	***Expert* Numeric Discrete:** Two solid-state ***Expert* Numeric Analog/Discrete:** 0 to 10V or 4 to 20 mA and Solid-state ***Expert* Bargraph Discrete:** Bipolar NPN/PNP **Discrete:** Bipolar NPN/PNP ***Expert* Small Object Counter:** NPN or PNP	***Expert:*** Solid-state **Standard:** Solid-state **AC Coupled:** Bipolar NPN/PNP	Bipolar NPN/PNP
Output Response Time	Depends on model	***Expert*:** 200 µs ON/OFF **Standard:** 50 or 500 µs ON/OFF **AC Coupled:** 50 µs ON/OFF	50 µs

* Operating temperature range for plastic fiber optic assemblies is typically -30° to +70° C and -140° to +250° C for metal-sheathed glass fiber optic assemblies. See the Fiber Sensor section (beginning on page 243) for specific fiber optic temperature information.

Special Purpose

					
Series	**LX**	**SLM**	**SL Series**	**R58**	
Catalog Page	**267**	**270**	**273**	**277**	
Description	High-speed light screens to detect tiny objects	Fixed opposed-mode metal slot sensor for easy installation, in eight slot widths	Opposed-mode slot sensor with multiple setup options, in two slot widths	High-performance color registration sensor with 3 light colors	
Maximum Sensing Range	**Standard** **Normal:** 300 to 2 m **Reduced:** 150 to 600 mm **Short-range** **Normal:** 100 to 200 mm **Reduced:** 75 to 150 mm	10, 20, 30, 50, 80, 120, 180 or 220 mm	10 or 30 mm	**Focus:** 10 mm	
Dimensions (h x w x d)	**25 x 32 mm x height** **Array heights:** 113 mm 190 mm 266 mm 342 mm 418 mm 494 mm 571 mm 647 mm	**Max size:** 12 x 252 x 140 mm	72 x 52 x 19 mm	62 x 30 x 83 mm	
Housing Material	Aluminum	Zinc and ABS	ABS	Zinc alloy	
Protection Rating	IP65	IP67; NEMA 6	IP67; NEMA 6	IP67	
Operating Temperature	-20° to +70° C	-20° to +60° C	**SL30, SL10 & SLO:** -40° to 70° C **SLE30 & SLE10:** -20° to 70° C	**R58E:** -10° to +50° C **R58A:** -10° to +50° C	
Power Supply	10 to 30V dc	10 to 30V dc	10 to 30V dc	10 to 30V dc	
Outputs	Bipolar NPN/PNP	Bipolar NPN/PNP, PNP or NPN	Bipolar NPN/PNP	Bipolar NPN/PNP	
Output Response Time	0.8 to 6.4 ms (ON-time) 6 to 11.5 ms (OFF-time)	500 µs	150, 300 or 500 µs or 1 ms, depending on model	50 µs	
Adjustments	—	One-turn sensitivity potentiometer	Depends on model	**R58E:** Push button and remote TEACH **R58A:** Potentiometer	

Special Purpose

	QC50 & QCX50	QL50	QL51	QL56	Optical Buttons
					
	282	**285**	**287**	**288**	**291**
	True color sensor for detecting color and intensity	Compact luminescence sensor with an ultraviolet LED	Compact luminescence sensor with an ultraviolet LED	Compact luminescence sensor with an ultraviolet LED	Ergonomic touch buttons to prevent repetitive motion stress
	20 mm (typical)	40 mm	20 mm	50 mm	—
	50 x 25 x 50 mm	66 x 15 x 50 mm	82 x 31 x 60 mm	97 x 66 x 32 mm	57 x 60 x 43 mm
	ABS	ABS	ABS	Aluminum	Black polysulfone or red polycarbonate with polyester or polycarbonate base
	IP62	IP62	IP67	IP67	IP66; NEMA 4X
	-10° to +55° C	-25° to +55° C	-10° to +55° C	-10° to +55° C	**OTB/LTB/VTB:** -20° to +50° C **STB:** 0° to +50° C
	10 to 30V dc	10 to 30V dc	15 to 30V dc	15 to 30V dc	10 to 30V dc, 20 to 30V ac/dc, 120V ac, 220/240V ac or 12 to 30V dc
	NPN or PNP, 3 channel	Discrete PNP or NPN	Bipolar PNP/NPN	Bipolar PNP/NPN & analog	Depends on model
	QC50: 335 µs **QCX50:** Selectable 5 ms or 1 ms	250 µs	250 µs	250 µs	**OTB/LTB/VTB:** 100 ms **STB:** 20 ms
	2 push buttons program teach, delay and tolerance level	1 push button and remote program wire	2 push buttons	2 push buttons	—

Selection Guide

Light Gauging

Series	LT3	LT7	
Catalog Page	296	300	
Description	Advanced laser distance-gauging sensor for precise inspections	Self-contained long-range laser sensor for accurate distance sensing	
Technology	Time-of-Flight Laser	Time-of-Flight Laser	
Maximum Sensing Range	**Retro:** 50 m **Diffuse:** 5 m	**Retro:** 250 m **Diffuse:** 10 m	
Dimensions (h x w x d)	69 x 35 x 87 mm	93 x 42 x 95 mm	
Light Source	Class 1 and 2 laser	Class 1	
Housing Material	ABS/polycarbonate	ABS	
Protection Rating	IP67; NEMA 6	IP67	
Operating Temperature	0° to +50° C	-30° to +75° C	
Power Supply	12 to 24V dc	18 to 30V dc	
Outputs	Analog and discrete, or dual discrete	Analog and discrete, or dual discrete	
Discrete Outputs	One NPN or PNP, or Dual NPN or PNP, depending on model	2 PNP	
Analog Outputs	0 to 10V dc or 4 to 20 mA	4 to 20 mA	
Analog Resolution or Discrete Repeatability	**Retro:** 5 or 10 mm **Diffuse:** 1 or 3.2 mm	**Retro:** ±2 mm **Diffuse:** ±4 mm	
Response Speed	1 to 192 ms, depending on model and setting	12 ms	
Adjustments	Window limits, response speed	See Specifications	

	Light Gauging	
		
	LH	**LG**
	303	**305**
	High-precision laser sensor for displacement and thickness measurements	Economical short-range laser sensor with analog and discrete outputs
	Laser /CMOS imager triangulation	Laser/PSD triangulation
	LH30: 35 mm **LH80:** 100 mm **LH150:** 200 mm	**LG5:** 60 mm **LG10:** 125 mm
	80 x 33 x 65 mm	55 x 20 x 82 mm
	Class 2 laser	Class 2 laser
	Aluminum	Zinc alloy die-cast; black painted finish
	IP67	IP67; NEMA 6
	-10° to +45° C	-10° to +50° C
	18 to 30V dc	12 to 30V dc
	Analog and Serial	Analog and discrete
	—	One NPN or PNP
	4-20 mA	0 to 10V dc or 4 to 20 mA
	LH30: 1 µm **LH80:** 4 µm **LH150:** 10 µm	**LG5:** 3 µm @ 50 mm **LG10:** 10 µm @ 100 mm
	250 µs typical	2, 10 or 100 ms, depending on setting
	Advanced configuration software	Window limits, response speed

Selection Guide

Ultrasonic

Series	QT50U	S18U	QS18U	T30UX/T30U	
Catalog Page	309	314	317	320	
Description	Long-range programmable, precision ultrasonic sensor	Compact barrel-mount ultrasonic sensor in straight or right-angle housing	Low-cost right-angle, barrel- and side-mount ultrasonic sensor in a compact universal housing	Compact right-angle barrel-mount ultrasonic sensors in long- and short-range	
Outputs	Analog, dual discrete or e/m relay	Analog or discrete	Discrete	Analog and discrete, dual discrete or analog	
Maximum Sensing Range	**Proximity mode** 200 mm to 8 m	**Proximity mode** 30 to 300 mm	**Proximity mode** **50 to** 500 mm	**Proximity mode** 0.15 to 1.0 m, 0.3 to 2.0 m, 0.1 to 1 m, 0.2 to 2.0 m or 0.3 to 3.0 m	
Dimensions (h x w x d)	**DC & AC/DC:** 84 x 74 x 67 mm **Teflon® Protected:** 85 x 74 x 73 mm	**Straight:** ø 18 x 81 mm **Right-angle:** ø 18 x 85 mm	41 x 15 x 33 mm	**Short- & Long-Range:** 52 x 40 x 45 mm **Teflon® Protected:** 64 x 40 x 48 mm	
Housing Material	ABS/polycarbonate	PBT polyester, ABS/ polycarbonate	ABS	PBT polyester	
Protection Rating	IP67; NEMA 6P	IP67; NEMA 6P	**Push button:** IP67; NEMA 6P **Remote TEACH:** IP68, NEMA 6P	**T30UX:** IP67; NEMA 6 **T30U:** IP67, NEMA 6P	
Operating Temperature	-20° to +70° C	-20° to +60° C	-20° to +60° C	**T30UX:** -40° to +70° C **T30U:** -20° to +70° C	
Power Supply	10 to 30V dc or 85 to 264V ac / 24 to 250V dc	10 to 30V dc	12 to 30V dc	10 to 30V dc, 12 to 24V dc or 15 to 24V dc, depending on model	
Discrete Outputs (when available)	**DC:** Selectable dual NPN or PNP **AC/DC:** SPDT e/m relay	Bipolar NPN/PNP	NPN or PNP	NPN or PNP, or NPN/PNP selectable, depending on model	
Analog Resolution or Discrete repeatability	1.0 mm	0.5 mm	0.7 mm	**T30UX:** 0.1% of distance **T30U:** 0.25% of sensing distance	
Analog Output (when available)	0 to 10V dc or 4 to 20 mA, Selectable	0 to 10V dc or 4 to 20 mA, depending on model	—	0 to 10V dc or 4 to 20 mA, depending on model	
High/low Limit Control (pump control)	Yes	—	—	Yes	
Adjustments	Window limits, DIP switch functions	Near & far window limits	Near & far window limits	Window limits, output selection, analog output slope, temperature compensation and response speed	

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Ultrasonic

	M25U	T18U	Q45U	Q45UR
				
	328	**330**	**332**	**336**
	Stainless steel opposed-mode ultrasonic sensors	Right-angle, barrel-mount opposed-mode ultrasonic sensors	Programmable ultrasonic sensor with temperature compensation	High-precision ultrasonic sensor with remote sensing transducer
	Discrete	Discrete	Analog or discrete	Analog or discrete
	Normal Speed: 500 mm **High Speed:** 250 mm	**Opposed mode** 0.6 m	**Proximity mode** 0.1 to 1.4 m or 0.25 to 3.0 m	**Proximity mode** 50 to 250 mm
	ø 25 x 103 mm	52 x 40 x 30 mm	**Short range:** 88 x 45 x 61 mm **Long range:** 88 x 45 x 79 mm	**Controller:** 88 x 45 x 6 mm **Remote transducers:** 28 x 28 x 12 mm flat or ø18 x 45 mm barrel
	316 stainless steel	PBT polyester	PBT polyester	PBT polyester or stainless steel
	IP67; NEMA 6, IP69K	IP67; NEMA 6P	IP67; NEMA 6P	**Sensor:** IP65; NEMA 4 **Controller:** IP67; NEMA 6P
	-20° to +70° C	-40° to +70° C	-25° to +70° C	-25° to +70° C
	10 to 30V dc	12 to 30V dc	12 to 24V dc or 15 to 24V dc, depending on model	12 to 24V dc or 15 to 24V dc, depending on model
	Bipolar NPN/PNP	Complementary NPN or PNP, depending on model	Bipolar NPN/PNP	Bipolar NPN/PNP
	Normal Speed: 4.0 ms **High Speed:** 3.0 ms	1 or 2 mm, depending on resolution	0.1% of sensing distance (0.25 or 0.5 mm min.)	0.2% of sensing distance
	—	—	Selectable 0 to 10V dc or 4 to 20 mA	Selectable 0 to 10V dc or 4 to 20 mA
	—	—	Yes	—
	—	—	Near & far window limits; DIP Switch functions	Near & far window limits; DIP Switch functions

Selection Guide

Measuring Arrays

				
Series		**EZ-ARRAY™**	**High-Resolution MINI-ARRAY®**	**MINI-ARRAY®**
Catalog Page		**341**	**344**	**348**
Description		Cost-effective light curtains for quick installation and tough sensing application	High-speed, high-resolution scanning	Compact long-range array with flexible output configurations
Minimum Object Detection Size		5 mm	2.5 mm	19 mm for arrays/ 9.5 mm beam spacing 38 mm for arrays/ 19 mm beam spacing
Maximum Sensing Range		4 m	0.4 mm to 1.8 m	0.6 to 17 m, depending on model
Emitters and Receivers	**Dimensions (h x w x d)**	**36.0 x 45.2 x height** **Array heights:** 227 mm, 828 mm, 1578 mm 379 mm, 978 mm, 1878 mm 529 mm, 1128 mm, 2178 mm 678 mm, 1278 mm, 2478 mm	**38.1 x 38.1 x height** **Array heights:** 236 mm, 887 mm, 1540 mm 399 mm, 1049 mm, 1703 mm 559 mm, 1215 mm, 1865 mm 724 mm, 1377 mm, 2028 mm	**38.1 x 38.1 x height** **Approximate array heights:** 201 mm, 810 mm, 1572 mm 356 mm, 963 mm, 1877 mm 505 mm, 1115 mm 659 mm, 1267 mm
	Power Supply	12 to 30V dc	Supplied by controller	Supplied by controller
	Construction	Anodized aluminum	Black anodized aluminum	Black anodized aluminum
	Protection Rating	IP65	IP65; NEMA 4, 13	IP65; NEMA 4, 13
	Operating Temperature	-40° to +70° C	0° to +50° C	-20° to +70° C
Controllers	**Power Supply**	—	16 to 30V dc	16 to 30V dc
	Output Configuration	—	**MAHCVP-1:** Two analog 0 to 10V sourcing + two PNP **MAHCVN-1:** Two analog 0 to 10V sourcing + two NPN **MAHCIP-1:** Two analog 4 to 20 mA sinking + two PNP **MAHCIN-1:** Two analog 4 to 20 mA sinking + two NPN **All models:** Serial RS-232 & RS-485	**MAC-1:**One reed relay & one NPN **MACN-1:** Two NPN **MAC16N-1:** 16 NPN **MACP-1:** Two PNP **MAC16P-1:** 16 PNP **MACV-1:** Two 0-10V dc sourcing analog + one NPN **MACI-1:** Two 4-20 mA sinking analog + one NPN Serial RS-232 and/or RS-485, depending on model **MACNXDN-1:** 2 NPN (DeviceNet) **MACPXDN-1:** 2 PNP (DeviceNet)
	Protection Rating	—	IP20; NEMA 1	IP20; NEMA 1
	Operating Temperature	—	0° to +50° C	-20° to +70° C

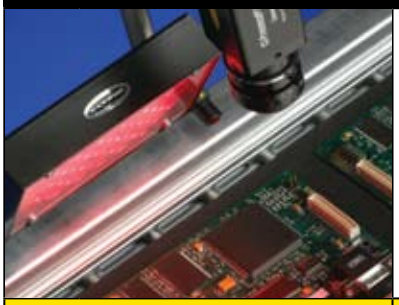
Radar	
	
Series	**R-GAGE™**
Catalog Page	**354**
Description	Radar-based sensor for a wide variety of outdoor or challenging applications
Operating Principle	Frequency Modulated Continuous Wave (FMCW) radar
Detectable Objects	Objects containing metal or similar high-dielectric materials
Radio Frequency	24 GHz, ISM Band
Range	up to 15 m
Dimensions	100 x 74 x 46 mm
Power supply	12 to 30V dc
Housing Material	ABS/polycarbonate
Protection Rating	IP67
Operating Temperature	-40° to +65° C
Output Configuration	Bipolar NPN/PNP
Adjustments	DIP-switch functions

Vision

Series		iVu TG	iVu Plus TG	iVu BCR	iVu Plus BCR
Catalog Page		364	364	364	364
Description		One-piece image sensor with integrated touch screen or two-piece image sensor with remote touch screen		One-piece image sensor with integrated touch screen or two-piece image sensor with remote touch screen	
Hardware	Integrated I/O	5	6	5	6
	Interchangeable Lenses	Microvideo	Microvideo	Microvideo	Microvideo
	Imager	CMOS 752 x 480	CMOS 752 x 480	CMOS 752 x 480	CMOS 752 x 480
	Effective Resolution	320 x 240	320 x 240	752 x 480	752 x 480
	Imager Speed	100 frames per second	100 frames per second	50 frames per second	50 frames per second
	Construction	Black Valox™ housing, acrylic window	Black Valox™ housing*, acrylic window	Black Valox™ housing, acrylic window	Black Valox™ housing*, acrylic window
	Environmental Rating	IP67	IP67	IP67	IP67
Communications	Serial	—	RS-232	RS-232	RS-232
	Ethernet	—	√	—	√
	Programmable Outputs	2	3	2	3
Programming/Interface	Runs without a PC	√	√	√	√
	Strobe OUT	√	√	√	√
	Remote TEACH	√	√	√	√
	Demo Mode	√	√	√	√
Inspection	Tools	Area, Blemish and Match	Area, Blemish, Match and Sort	Bar Code	Bar Code
	Multiple Inspections	—	√	—	√

* Die cast Zinc on Plus Integrated LCD models

Vision

				
Series		***Pro***	***P4* OMNI**	***P4* Dedicated Function**
Catalog Page		**370**	**370**	**377**
Description		Two-piece, all-purpose vision sensor with a full range of inspection tools	One-piece, all-purpose vision sensor with a full range of inspection tools	**AREA:** Inspects sizes, shapes and intensity **EDGE:** Counts and measures multiple edges and objects **GEO:** Pattern recognition, regardless of orientation **BCR:** Reads and grades 2D and 1D bar codes
Hardware	**Integrated I/O**	14	7	7
	Interchangeable Lenses	C-Mount	C-Mount	C-Mount
	Imager	**PROII:** CCD & CMOS **PROII 1.3:** CMOS **PROII COLOR:** CMOS	**OMNI:** CCD **OMNI 1.3:** CMOS **OMNI COLOR:** CMOS	**AREA & AREA 1.3:** CMOS **BCR:** CCD, **BCR 1.3:** CMOS **EDGE & EDGE 1.3:** CMOS **GEO & GEO 1.3:** CMOS
	Resolution	**PROII:** 640 x 480 **PROII 1.3:** 1280 x 1024 **PROII COLOR:** 752 x 480	**OMNI:** 640 x 480 **OMNI 1.3:** 1280 x 1024 **OMNI COLOR:** 752 x 480	**AREA, EDGE & GEO:** 128 x 100 **BCR:** 640 x 480 **AREA1.3, EDGE 1.3, GEO 1.3 & BCR 1.3:** 1280 x 1024
	Imager Speed (frames per second)	**PROII:** 48 fps **PROII 1.3:** 18 fps **PROII COLOR:** 17 fps	**OMNI:** 48 fps **OMNI 1.3:** 27 fps **OMNI COLOR:** 17 fps	**AREA, EDGE & GEO:** 500 fps **BCR:** 48 fps **AREA1.3, EDGE 1.3, GEO 1.3 & BCR 1.3:** 27 fps
	Live Video Output	√	√	√
	Memory	64 MB	32 MB	**AREA, EDGE, GEO & BCR:** 8 MB **AREA1.3, EDGE 1.3, GEO 1.3 & BCR 1.3:** 32 MB
	Construction/ Environmental Rating	**Camera:** Black anodized aluminum/ IP20; NEMA 1 **Camera:** Nickel-plated aluminum/ IP68, NEMA 6P **Camera:** 316 stainless steel/ IP68; NEMA 6P & 4X **Controller:** Steel with zinc plating/ IP20; NEMA 1	Black anodized aluminum/IP20; NEMA 1 or Nickel-plated aluminum/ IP68	Black anodized aluminum/IP20; NEMA 1
Communications & Programming/Interface	**Ethernet**	10/100		
	Serial	RS-232		
	Programmable Discrete I/O	6	4	4
	Industrial Ethernet Protocols	EtherNet/IP & Modbus TCP/IP	EtherNet/IP & Modbus TCP/IP	EtherNet/IP & Modbus TCP/IP
	Software Premium Tools	Bar Code Reader (BCR), OCR/OCV and Bead		OCR/OCV (BCR model only)
	Runs without a PC	Yes		
	ActiveX interface	√	√	√
	Quick & Remote TEACH	√	√	√

Selection Guide

Wireless

				
Series	**DX70**	**DX80**	**DX99**	**Data Radio**
Catalog Page	**385**	**388**	**396**	**398**
Description	Point-to-Point Wireless I/O Pairs	Point-to-Multipoint Wireless Network	Point-to-Multipoint for Hazardous Areas	MultiHop Wireless Network
Radio Frequency & Range	**900 MHz:** up to 4.8 km **2.4GHz:** up to 3.2 km	**900 MHz:** up to 4.8 km **2.4GHz:** up to 3.2 km	**900 MHz:** up to 4.8 km **2.4GHz:** up to 3.2 km	**900 MHz:** up to 9.6 km **2.4 GHz:** up to 3.2 km
Power Supply	10 to 30V dc	10 to 30V dc, Solar, DX81 or DX81P6	Integrated battery	10 to 30V dc, Solar or DX81P6
Inputs/Outputs	**Discrete:** PNP/NPN, Dry Contact **Analog:** 0-20 mA	**Discrete:** PNP/NPN/NMOS, Dry Contact Counter **Analog:** 0-20 mA, 0-10V dc, PT100 RTD, Thermocouple	**Discrete:** PNP/NPN/NMOS, Dry Contact **Analog:** 0-20 mA, 0-10V dc, PT100 RTD, Thermocouple	Contact the factory
Dimensions & Housing Material	**Polycarbonate:** 127 X 81 X 60 mm	**Polycarbonate:** 127 X 81 X 60 mm	127 X 110 mm	**Polycarbonate:** 127 X 81 X 60 mm
Protection Rating	IP67; NEMA 6	**DX80:** IP67; NEMA 6 **DX80…C:** IP20; NEMA 1	IP68; NEMA 4X	IP67; NEMA 6
Certified Area	—	**DX80…C:** Cl D2, Zone 1	Cl D1, Zone 0 and 20	Cl D2, Zone 2
Operating Temperature	-40˚ to +85˚ C	-40˚ to +85˚ C	-40˚ to +70˚ C	-40˚ to +85˚ C
Communication	I/O linking only, no serial communication output	**Gateway:** Modbus RTU Master and Slave, Modbus TCP/IP and EtherNet/IP	See DX80 Gateway	**Modbus:** RS-232 and RS-485 or EtherNet/IP

Task Lights			
			
Series	**WL50/WL50F**	**WLS28**	**WLA**
Catalog Page	**405**	**407**	**410**
Description	50 mm light for enclosure and area lighting	28 mm wide industrial strip lighting for enclosure and area lighting	Rugged, sealed light for area and machine lighting
Color	White	White	White
Dimensions	**WL50:** 47.5 x 50 mm **WL50F:** 76 x 23 x ø 50 mm	28 x 21 x (H) mm **(H):** 183.5 to 1181 mm (depending on position and light length)	105 x 180 mm 190 x 180 mm 275 x 180 mm 360 x 180 mm
Power Supply	10 to 30V dc	12 to 30V dc	12 to 30V dc
Construction	Polycarbonate	Clear anodized aluminum	Valox™
Mounting	**WL50:** 30 mm threaded base mount **WL50F:** Flat mount	End mounting	Flat mount
Environmental Rating	**Standard models**: IP69K per DIN 40050 **Push-button models**: IEC IP67	IP50	IP69K

Selection Guide

Vision Lights

			
Series	**Ring Lights**	**Area Lights**	**Backlights**
Catalog Page	**416**	**418**	**420**
Description	Mounts directly to the sensor for easy setup and illuminates any object directly in front of the sensor	Provides even illumination in a concentrated area	Installs behind the target, directly facing the sensor; has a highly diffused surface and uniform brightness

		
Linear Array Lights	**On-Axis Lights**	**Low-Angle Ring LIghts**
421	**422**	**422**
Provides high-intensity illumination of large areas, at long distances	Provides collimated illumination along the same optical path as camera	Illuminates nearly perpendicular to the direction of an inspection

		
Spot Lights	**Tubular Fluorescent Lights**	**Structured Lights**
423	**424**	**424**
Provides even illumination in a small concentrated spot	Features flicker-free high-intensity illumination of large areas	Uses Class 2 laser line for 3-dimensional sensing

For additional Vision Lighting selection information, see page 415.

Indicators

			
Series	**TL50 Tower Lights**	**TL30F Tower Lights**	**CL50 Column Lights**
Catalog Page	**428**	**428**	**432**
Description	Preassembled and preconfigured multi-segment indicators with up to five colors in a single tower	Preassembled and preconfigured multi-segment indicators with three or five colors in one tower	Large single illuminated segment with 30 mm base
Maximum Colors in One Housing*	**General-Purpose:** 5 **Audible:** 4	5	3 & Audible Alert
Indication	**General-Purpose:** Green, Yellow, Red, Blue, White **Audible:** Green, Yellow, Red, Blue, White, Audible Alert	**General-Purpose:** Green, Yellow, Red, Blue, White	**General-Purpose:** Green, Red, Yellow **Audible:** Green, Red, Yellow and Audible Alert
Typical Audible	**IP50:** 92 dB @ 1 m **IP67:** 94 dB @ 1 m	—	**Typical :** 92 dB @ 1 m
Dimensions	ø 50 mm x (H) **Tower Height (H)** **General Purpose:** 61.2 to 224.0 mm **Audible (IP50):** 92.0 to 214.1 mm **Audible (IP67):** 74.4 to 237.2 mm	30 x 19.1 mm x height **Tower Height** **3 Color:** 128.1 mm **5 Color:** 204.3 mm	**General Purpose:** ø 50 x 114.2 mm **Audible (IP50):** ø 50 x 145.3 mm **Audible (IP67):** ø 50 x 168.2 mm
Mounting	30 mm threaded base mount	Flat mount	30 mm threaded base mount
Construction	ABS/Polycarbonate (black or gray housings)	Black Painted Aluminum	Polycarbonate
Environmental Rating	**General-Purpose:** IP67 **Audible:** IP50 or IP67, depending on model	IP65	**General-Purpose:** IP67 **Audible:** IP50 orIP67, depending on model
Operating Temperature	**General-Purpose:** -40° to +50° C **Audible:** -20° to +50° C	-40° to +50° C	**General-Purpose:** -40° to +50° C **Audible:** -20° to +50° C
Power Supply	18 to 30V dc or 24V ac	18 to 30V dc or 24V ac	18 to 30V dc

* Contact factory for other colors and color combinations.

Selection Guide

Indicators

Housing	K80L	K50L & K50FL	T30	K30L	
					
Catalog Page	**444**	**444**	**432**	**432**	
Description	50 mm dome or flat profile	50 mm dome or flat profile	30 mm T-style	30 mm dome	
Maximum Colors in One Housing	5	5	3	3	
Indication*	**General-Purpose:** Green, Red, Yellow **Multi-Function:** Green, Red, Yellow, Blue, White ON, flashing or alternating **Sensor Emulator:** Green, Yellow **Audible:** Green, Red, Yellow, Steady or Pulsed Tone **Segmented:** Green, Red, Yellow, Blue, White	**General-Purpose:** Green, Red, Yellow **Multi-Function**: Green, Red, Yellow, Blue, White ON, flashing or alternating **Sensor Emulator:** Green, Yellow **Audible:** Green, Red, Yellow, Steady or Pulsed Tone **Daylight Visible:** Green, Red, Yellow, Blue, White	**General-Purpose:** Green, Red, Yellow **Multi-Function:** Green, Red, Yellow ON, flashing or alternating **Sensor Emulator:** Green, Yellow	**General-Purpose:** Green, Red, Yellow **Sensor Emulator:** Green, Yellow	
Audible	**Steady or Pulsed:** Typical—75 dB @ 1 m Min—66 dB @ 1 m **Loud Steady:** Typical—92 dB @ 1 m Min—84 dB @ 1 m	**Steady or Pulsed:** Typical—75 dB @ 1 m Min—66 dB @ 1 m **Loud Steady:** Typical—92 dB @ 1 m Min—84 dB @ 1 m	—	—	
Dimensions	**Segmented:** 110 x 81 x 41mm **All others:** 110 x 81 x 66 mm	**K50L:** 57 x ø 50 mm **K50FL:** 60 x ø 50 mm **Daylight visible:** 50 x ø 50 mm	64 x 40 x 45 mm	42 x ø 30 mm	
Mounting	Flat or DIN-rail mount	30 mm threaded base or flat mount	30 mm threaded mount	22 mm threaded base mount	
Construction	Polycarbonate	**K50L:** Polycarbonate **K50FL:** ABS/polycarbonate **Daylight Visible:** Polycarbonate	Thermoplastic polyester	Polycarbonate	
Protection Rating	**Audible:** IP50 **All others:** IP67	**Audible:** IP50 **All others:** IP67	IP67	IP67	
Operating Temperature	**Audible:** -20° to +50° C **All others:** -40° to +50° C	**Audible:** -20° to +50° C **All others:** -40° to +50° C	-40° to +50° C	-40° to +50° C	
Power Supply	18 to 30V dc, 24V dc or 85 to 130V ac	15 to 30V dc, 24V dc, 18 to 30V dc or 85 to 130V ac depending on model	10 to 30V dc	10 to 30V dc	

* Contact factory for other colors and color combinations.

					Indicators
					
	T18	**M18**	**T8L**	**K80CLR Call Light**	**Traffic Lights**
	432	**432**	**432**	**439**	**440**
	18 mm T-style	18 mm barrel	8 mm T-style	Battery-powered 50 mm dome	Preassembled indicators for signaling and traffic control
	3	3	2	1	**1 Light:** 3 **2 Light:** 1 (each light) **3 Light:** 1 (each light)
	General-Purpose: Green, Red, Yellow **Sensor Emulator:** Green, Yellow	**General-Purpose:** Green, Red, Yellow **Multi-Function:** Green, Red, Yellow ON, flashing or alternating **Sensor Emulator:** Green, Yellow	**General-Purpose:** Green, Red, Yellow **Sensor Emulator:** Green, Yellow	Red	**1 Light:** Green, Red, Yellow **2 Light:** Top—Red Bottom—Green **3 Light:** Top—Red Middle—Yellow Bottom—Green
	—	—	—	—	—
	40 x 33 x ø 16 mm	51 x ø 18 mm	19 x 16 x ø 16 mm	80 x 81 x 41 mm	**1 Light:** 110 x 81 x 92 mm **2 Light:** 190 x 88 x 110 mm **3 Light:** 210 x 80 105 mm
	18 mm threaded mount	18 mm threaded barrel mount	8 mm threaded nose mount	Flat or DIN-mount	Flat or DIN-mount polycarbonate
	Thermoplastic polyester	Nickel-plated brass	Polycarbonate/ABS blend	Polycarbonate	Polycarbonate
	IP67	IP67	IP67	IP50	**1 Light:** IP67 **2 & 3 Light:** IP65
	-40° to +50° C	-40° to +50° C	-40° to +50° C	-20° to +50° C	-40° to +50° C
	10 to 30V dc	10 to 30V dc	10 to 30V dc	18V (two 9V batteries)	15 to 30V dc or 85-130V ac, depending on model

Selection Guide

Actuators

Series	K50 & K80	PVD	PVA	VTB
				
Catalog Page	**444**	**448**	**450**	**453**
Description	50 mm dome light with sensor in two housing styles	One-component light sensor for part assembly and error-proofing	Two-component light screen for part-pick verification	Ultra-bright optical touch buttons for indicating bin-picking sequences
Job Light Color	Green, Red, Yellow	Green, Red	Green	Green, Red, Blue
Maximum Sensing Range	**Retroreflective:** 2 m **Fixed-Field:** 100 mm **Push button:** —	**Retroreflective:** 2 m **Diffuse:** 400 mm	**Opposed:** 2 m	—
Minimum Object Detection Size	—	**Retroreflective:** 51 to 100 mm **Diffuse:** 55 mm	**Opposed:**35 mm	—
Dimensions (h x w x d)	**K50:** ø 50 x 57 mm **K80:** 110 x 81 x 73 mm	**PVD100:**138 x 30 x 16 mm **PVD225:** 266 x 30 x 16 mm	30 x 15 mm x height **Array heights:** 138 mm 341 mm 266 mm 417 mm	57 x 60 x 43 mm
Construction	Polycarbonate & Thermoplastic	Black painted aluminum	Black anodized aluminum	Black polysulfone or red polycarbonate with white polycarbonate base
Protection Rating	IP69K (depending on installation)	IP62; NEMA 2	IP62; NEMA 2	IP66; NEMA 4X
Operating Temperature	-40° to +50° C	0° to +50° C	0° to +50° C	-20° to +50° C
Power Supply	12 to 30V dc	12 to 30V dc	12 to 30V dc	12 to 30V dc
Output configuration	One NPN or PNP & NO or NC, depending on model	One user-selectable PNP or NPN	One NPN or PNP, depending on model; programmable for light or dark operate	One NPN or PNP, depending on model

Safety Light Screens			
			
Series	**EZ-SCREEN® Type 4**	**EZ-SCREEN® Type 2**	**PICO-GUARD™**
Catalog Page	**473**	**489**	**502**
Description	2-piece system • 14 or 30 mm resolution light screen • 14 or 25 mm resolution LP light screen • 2-, 3- or 4- Beam Grids • Single-beam Points	2-piece, 30 mm resolution light screen system for lower risk applications	Fiber Optic System • 2-, 3- or 4- Beam Grids • Single-beam Points For use with PICO-GUARD controller
Safety Rating (Depends on model)	Type 4 /Category 4/PLe	Type 2 /Category 2	Type 4 /Category 4
System Components	Emitter, receiver and one cordset for each. Optional interfacing components available.	Emitter, receiver and one cordset for each. Optional interfacing components available.	1 to 4 fiber optic element pairs, plus a controller
Range	**14 or 30 mm:** up to 18 m **14 or 25 mm:** up to 7 m **Grids & Points:** up to 70 m	up to 15 m	up to 31 m
Supply Voltage	24V dc	24V dc	24V dc
Safety Output	2 PNP OSSD	2 PNP OSSD	2 PNP OSSD
Aux. Output	Yes	—	Yes
Response Time	8 to 56 ms, depending on model	11 to 25 ms	13 ms
Defined Area (Protected Height)	**14 mm resolution:** 150 to 1800 mm **30 mm resolution:** 150 to 2400 mm **14 or 25 mm resolution:** 270 to 1810 mm **Grids:** 500 to 1066 mm **Points:** 25 mm beam diameter	150 to 1500 mm	**Grids:** 500 to 1066 mm **Points:** 9 to 25 mm beam diameter
Cascading	Allow up to 4 emitter/receiver pairs (14, 25 or 30 mm systems) to be wired together to form a single safety device. Only matched pairs must be the same length and resolution.	—	Multiple PICO-GUARD controllers can be interconnected

Selection Guide

Safety Laser Scanner

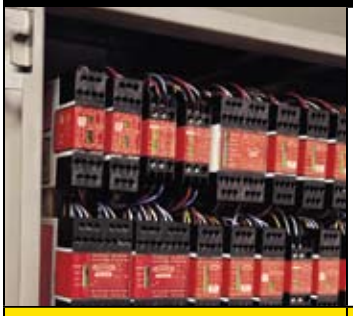
Series	AG4
Catalog Page	503
Description	Two-dimensional, programmable area scanner
Safety Rating (Depends on model)	Type 3/Category 3
System Components	Laser scanner, configuration cordset and communication cordset
Protective Field	up to 6 m
Warning Field	up to 15 m
Scanning Angle	190°
Supply Voltage	24V dc
Safety Output	2 PNP OSSD
Aux. Output	2 PNP
Response Time	80 ms (adjustable to 640 ms)

Safety Controllers

Series	SC22-3/-3E	PICO-GUARD™
Catalog Page	526	508
Description	Four standard models and four models for direct connectivity to EtherNet/IP and Modbus TCP industrial networks	Two models with different output configurations and one model with muting
Safety Rating (Depends on models)	Category 2, 3 or 4	Type 4/Category 4
Functional Stop Category	0 & 1	0
Voltage	24V dc	24V dc
Inputs	22 input terminals monitor safety and non-safety devices.	Up to 4 fiber optic channels (optical channels) controlling one or more optical elements, depending on optical element. Also, two inputs for external safety devices (USSI)* or mute, depending on model.
Safety Output	6 PNP (3 pair)	2 PNP OSSD
Aux. Output	10 discrete status outputs, EtherNet/IP & Modbus TCP	3 or 7 solid-state, depending on model
Output Response Time	10 ms	**Optical channels:** 13 ms **USSIs:** 7 ms (except muting)

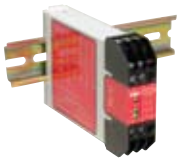
* USSI = Universal Safety Stop Interface

Safety Modules



Series	E-Stop & Interlocked Guard	Universal Input	Safety Mat	Muting	Safe Speed
					
Catalog Page	**531**	**539**	**541**	**544**	**548**
Description	Modules monitor contacts of E-stop switches, guard interlock switches or the outputs of other safety modules.	Modules monitor one or two solid-state PNP or relay contact outputs from safety or non-safety devices, such as sensors or safety light screens.	Modules monitor one 4-wire safety mat (or multiple connected in series).	Modules suspend safeguarding during non-hazards time in the machine's cycle.	Modules monitor two sensors with PNP outputs for rotation and linear movements.
Safety Rating (Depends on model)	Category 2 or 4, depending on model	Category 2, 3 or 4	Category 3 (with mat)	Category 2, 3 or 4	Category 3
Functional Stop Category	0 & 1	0	0	0	0
Supply Voltage	24V ac/dc, 115V ac & 12-24V dc, 230V ac & 12-24V dc or 24V dc	24V ac/dc	115V ac & 12-24V dc or 230V ac & 12-24V dc	24V dc	24V ad/dc
Safety Outputs	2 NO, 3 NO, 4 NO, 2 NO & 2 NO w/delay or 4 NO & 4 NO w/delay	3 NO or 2 NO	4 NO	2 PNP OSSD or 2 NO	2 NO
Aux. Outputs	1 NC, 1 NC & 2 PNP, or 1 NC (immediate) & 1 NC (delayed)	1 NC	1 NC & 2 PNP	1 PNP or 1 NC	1 NC
Output Response Time	25, 35 or 50 ms	25 ms	50 ms	10 or 20 ms	700 or 350 ms

Safety Modules



Series	Extension Relay	Interface Relay
Catalog Page	**550**	**552**
Description	Single or dual (depending on model) input channels accept the outputs of a primary safety device. Modules provide additional safety outputs for a primary safety device. Typically interfaced with safety modules with relay outputs.	One dual input accepts the single or dual safety output of a primary safety device. Typically interfaced with devices solid-state OSSD Outputs. Module increases switching current capacity (up to 6 amps) for the output of a primary safety device.
Safety Rating (Depends on model)	Category 2, 3 or 4 (Depends on hookup)	Category 2, 3 or 4 (Depends on hookup)
Functional Stop Category	0 or 1	0
Supply Voltage	24V dc or 24V ac/dc, depending on model	24V dc
Safety Outputs	4 NO or 4 NO (w/delay)	3 NO or 2 NO
Aux. Outputs	—	1 NC, depending on model
Output Response Time	20, 30 or 35 ms, depending on model	20 ms

Two-Hand Control

Series	DUO-TOUCH® SG THC Modules	DUO-TOUCH® SG Run Bars
Catalog Page	556	564
Description	Two-Hand Control Modules; STB compatible	Two-hand control Run Bar with pre-mounted STB buttons
Inputs	Two STB Self-Checking Touch Buttons or Form C Mechanical Button	Requires IIIC Two-Hand Control logic device for safe guarding applications
Safety Rating	Category 4 (module); Type IIIC	Dependent on controller/module
Modules	Five models with different supply voltage, outputs and control functions (example, muting)	Five models with different supply voltage, outputs and control functions (purchased separately)
Supply Voltage	24V ac/dc, 115V ac/24V dc or 230V ac/24V dc, depending on model	10 to 30V dc
Safety Outputs	2 NO or 4 NO	—
Aux. Outputs/Function	**AT-FM-10K:** none **All others:** 1 NPN, 1 PNP & 1 NC	Models with or without E-Stop buttons
STB Touch Buttons	6 models with varying supply voltage, output type, cable and housing material Kits with modules and STB buttons available	2 x STBVP6

Selection Guide

Safety Interlock Switches






Series	PICO-GUARD™	Magnet	Hinge	Compact Plastic & Metal	Locking
Catalog Page	**568**	**569**	**572**	**578 & 584**	**587**
Type	Fiber Optic	Magnetic	Electromechanical Non-Locking	Electromechanical Non-Locking	Electromechanical Locking
Package Style	2-piece	2-piece	1-piece	2-piece	2-piece
Housing Material	Plastic or metal	Plastic	Plastic or metal	Plastic or metal	Plastic or metal
Actuator Contacts	For use with PICO-GUARD controller	1 NO & 1 NC	2 NC & 1 NO, SPDT (Form C), 1 NC & 1 NO, or 2 NC	2 NC & 1 NO, 1 NC & 1 NO, 2 NC, 1 NC, or 1 NO & 1 NC	1 NC & 1 NO, 2 NC, 2 NC & 1 NO, or 3 NC
Solenoid Contacts	—	—	—	—	1 NC & 1 NO, or 1 NC

Emergency Stop & Stop Control Devices				
				
Series	**PICO-GUARD™**	**Mechanical E-Stop Buttons**	**Rope Pull Switches**	**Enabling Devices**
Catalog Page	**599**	**601**	**605**	**615**
Description	Optical E-Stop Push Buttons	Mechanical E-Stop Push Buttons	E-Stop and Stop Control Rope Pulls	Stop Control Enabling Devices
Housing Material	Plastic or metal	Plastic or metal	Plastic or metal	Plastic
Contacts	For use with PICO-GUARD controller	2 NC, 1 NC & 1 NO, or 2 NC & 1 NO	**Safety Contacts:** 2 NC or 4 NC **Aux. Contacts:** 2 NO or 1 NO	2 NC & 1 NO Aux. or 2 NC & 1 NO Aux. & 1 NO momentary push button, or 2 NC & 2 NO momentary push button

Applications

Sensor Applications

Low-Profile Object Detection

ONLINE LOOK FOR MORE INFO

Objective:
To detect the presence of integrated circuit chips in a confined space.

page 60

Reflective Object Counting

ONLINE LOOK FOR MORE INFO

Objective:
To reliably count metal rings passing on a conveyor.

page 60

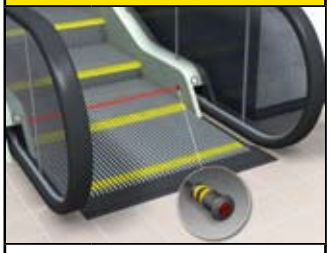
Part Presence

ONLINE LOOK FOR MORE INFO

Objective:
To verify the presence of colored caps on bottles of children's medicine.

page 60

People Detection

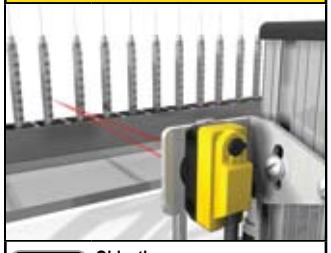


ONLINE LOOK FOR MORE INFO

Objective:
To detect people as they enter/exit an escalator.

page 71

Precise Counting



ONLINE LOOK FOR MORE INFO

Objective:
To count the narrow barrels of syringes.

page 88

Sorting

ONLINE LOOK FOR MORE INFO

Objective:
To sort letters from packages, based on height.

page 88

Liquid Leak Detection

ONLINE LOOK FOR MORE INFO

Objective:
To detect a hazardous fluid leaking from pipes inside a valve box.

page 88

Reflective Package Detection

ONLINE LOOK FOR MORE INFO

Objective:
To detect the presence of product wrapped in reflective Mylar on a conveyor belt.

page 88

Tilt Tray Inspection

ONLINE LOOK FOR MORE INFO

Objective:
To detect items in a tray for sorting.

page 103

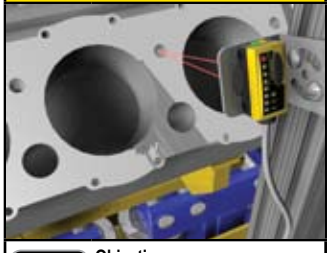
Outsert Detection

ONLINE LOOK FOR MORE INFO

Objective:
To ensure that a coupon is present before applying it to a bottle cap.

page 103

Thread Hole Inspection



ONLINE LOOK FOR MORE INFO

Objective:
To verify, from a distance, that threads have been cut into holes in a manifold.

page 150

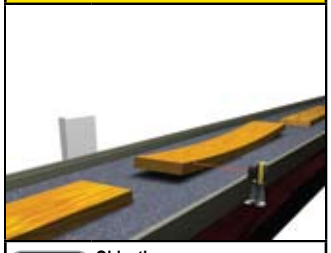
Feeder Bowl Level Monitoring

ONLINE LOOK FOR MORE INFO

Objective:
To monitor supply level of caps as they move out of the feeder bowl.

page 150

Lumber Inspection



ONLINE LOOK FOR MORE INFO

Objective:
To check lumber for warping.

page 150

Vehicle Detection

ONLINE LOOK FOR MORE INFO

Objective:
To verify that a vehicle is in position in a car wash.

page 150

Liquid Detection

ONLINE LOOK FOR MORE INFO

Objective:
To detect water or liquid containing water, regardless of bottle color.

page 150

Clear Bottle Counting

ONLINE LOOK FOR MORE INFO

Objective:
To reliably count clear bottles moving on a high-speed conveyor line.

page 150

Sensor Applications

Long-Distance Feature Detection

ONLINE LOOK FOR MORE INFO

Objective:
To detect a small flange from a long distance.

page 217

Product Flow Control

ONLINE LOOK FOR MORE INFO

Objective:
To signal the machine control when cans are absent, using a time delay to filter out gaps between the cans.

page 217

Edge Guiding

ONLINE LOOK FOR MORE INFO

Objective:
To keep a roll of plastic in the correct position by monitoring the edge.

page 226

Lead Frame Presence Detection

ONLINE LOOK FOR MORE INFO

Objective:
To detect the presence of an IC lead frame.

page 226

Loop Tension Monitoring

ONLINE LOOK FOR MORE INFO

Objective:
To control the speed of a web using a loop control system.

page 226

Wafer Mapping

ONLINE LOOK FOR MORE INFO

Objective:
To map the presence of wafers in a cassette.

page 226

Poly Bag Seal Detection

ONLINE LOOK FOR MORE INFO

Objective:
To locate the perforations between bags on a web.

page 226

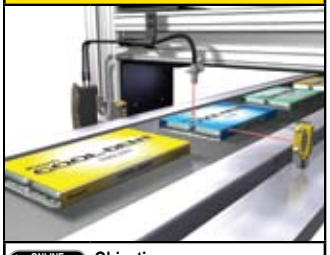
Thread Break Detection

ONLINE LOOK FOR MORE INFO

Objective:
To detect broken threads on a loom.

page 226

Color Sorting



ONLINE LOOK FOR MORE INFO

Objective:
To sort gum packets by label color.

page 226

Pill Counting

ONLINE LOOK FOR MORE INFO

Objective:
To quickly and accurately count small pills, tablets and gelatin tablets to ensure correct fill level.

page 226

Part Detection Error-Proofing

ONLINE LOOK FOR MORE INFO

Objective:
To check that certain steps have been performed before the assembly process can continue.

page 226

Equipment Inspection

ONLINE LOOK FOR MORE INFO

Objective:
To check whether the weld tips of an automotive welder are within specifications.

page 240

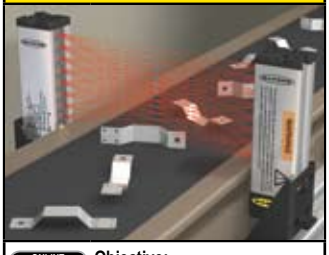
Small Part Detection

ONLINE LOOK FOR MORE INFO

Objective:
To detect extremely small parts as they fall through a web of sensing beams.

page 267

Small Object Detection



ONLINE LOOK FOR MORE INFO

Objective:
To accurately detect flat objects passing on a conveyor.

page 267

Splice Detection

ONLINE LOOK FOR MORE INFO

Objective:
To identify splices on a roll of paper.

page 277

Registration Mark Detection

ONLINE LOOK FOR MORE INFO

Objective:
To detect registration marks on labels as they pass at high speeds.

page 277

Applications

Sensor Applications

Counting

ONLINE LOOK FOR MORE INFO

Objective:
To count syringe barrels in an assembly line.

page 270

Gear Tooth Sensing

ONLINE LOOK FOR MORE INFO

Objective:
To sense the teeth of a timing gear to produce pulses used in automated production machinery.

page 273

Tamper Evident Seal Detection

ONLINE LOOK FOR MORE INFO

Objective:
To detect the presence of a tamper evident seal on a bottle.

page 287

Range of Motion

ONLINE LOOK FOR MORE INFO

Objective:
To accurately measure the range of motion of an auto seat back.

page 299

Dry Fill Level

ONLINE LOOK FOR MORE INFO

Objective:
To accurately determine the level of dry bulk material in a bin hopper, despite the material's uneven surface.

page 295

Extremely Long-Range Sensing

ONLINE LOOK FOR MORE INFO

Objective:
To instantly measure the location of an automated storage and retrieval shuttle, to track its position.

page 300

Long-Range Sensing

ONLINE LOOK FOR MORE INFO

Objective:
To detect the presence and position of a car seat on an automotive assembly line.

page 300

Thickness Measurement

ONLINE LOOK FOR MORE INFO

Objective:
To measure thickness of drywall at the points across the width of a sheet.

page 305

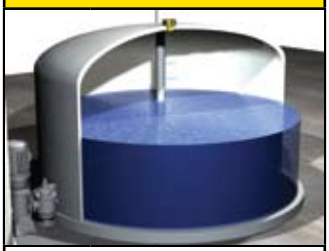
Wood Profiling

ONLINE LOOK FOR MORE INFO

Objective:
To accurately profile wooden moldings, regardless of color.

page 295

Liquid Level Monitoring

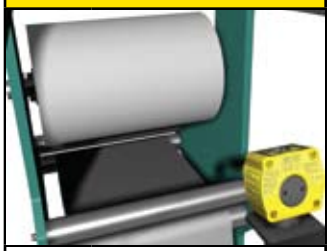


ONLINE LOOK FOR MORE INFO

Objective:
To monitor the level of liquid in a tank by sending a continuous signal that represents the current depth.

page 309

Roll Size



ONLINE LOOK FOR MORE INFO

Objective:
To monitor the decreasing size of a roll of material, so it can be replaced when empty.

page 309

Pallet Load

ONLINE LOOK FOR MORE INFO

Objective:
To detect that a pallet with packages stacked at different heights is loaded and ready for wrapping.

page 309

Loop Control

ONLINE LOOK FOR MORE INFO

Objective:
To control the amount of play in a loop of clear plastic within a set range.

page 314

Liquid Level Detection

ONLINE LOOK FOR MORE INFO

Objective:
To accurately determine the level of liquid in a narrow tube.

page 314

Bottle Counting

ONLINE LOOK FOR MORE INFO

Objective:
To count tinted glass bottles on a conveyor in a soft drink bottling operation.

page 317

Liquid Level Detection

ONLINE LOOK FOR MORE INFO

Objective:
To monitor the level of soap in a reservoir in a car wash.

page 317

Sensor Applications

Loop Control of Clear Plastic

ONLINE LOOK FOR MORE INFO

Objective:
To control the speed of a web by reliably detecting the clear plastic film.

page 320

Moonroof Detection

ONLINE LOOK FOR MORE INFO

Objective:
To reliably detect the presence of clear glass to ensure that the moonroof has been installed.

page 320

Pharmaceutical Bottle Detection

ONLINE LOOK FOR MORE INFO

Objective:
To reliably detect clear bottles in an aseptic environment.

page 328

Inverted Object Detection

ONLINE LOOK FOR MORE INFO

Objective:
To detect a product that has flipped over by measuring small differences in height.

page 332

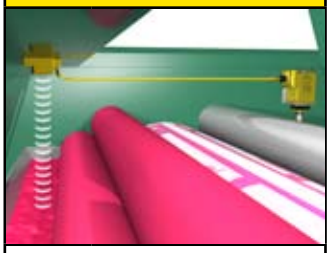
Height Measurement

ONLINE LOOK FOR MORE INFO

Objective:
To verify that a stack of boards has the correct number.

page 336

Ink Level

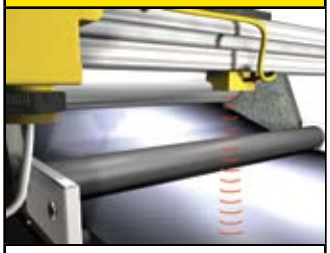


ONLINE LOOK FOR MORE INFO

Objective:
To monitor the ink level in a printer tray.

page 336

Web Thickness



ONLINE LOOK FOR MORE INFO

Objective:
To measure the thickness of webbing.

page 336

Empty Rack Verification

ONLINE LOOK FOR MORE INFO

Objective:
To verify that all glass hard disks are removed from the holding rack after the disks are rinsed.

page 330

Carton Sizing

ONLINE LOOK FOR MORE INFO

Objective:
To measure height, length and width of cartons for storage or palletizing

page 340

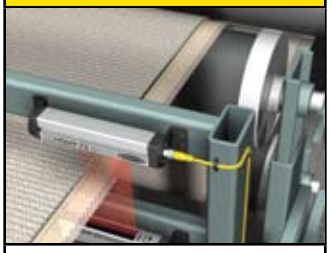
Plastic Bottle Detection

ONLINE LOOK FOR MORE INFO

Objective:
To ensure that clear bottles are properly placed on a conveyer.

page 340

Carpet Web Detection



ONLINE LOOK FOR MORE INFO

Objective:
To determine the location of two edge transitions on carpet web: air to selvage and selvage to tufting.

page 340

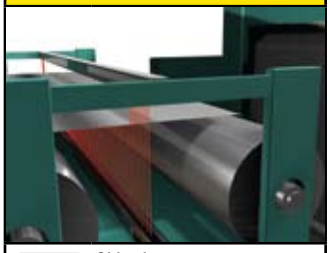
Vehicle Separation

ONLINE LOOK FOR MORE INFO

Objective:
To detect vehicle separation in an Automated Vehicle Classification (AVC) system.

page 348

Edge Monitoring



ONLINE LOOK FOR MORE INFO

Objective:
To track the edge of a web as it rolls, to make sure it stays aligned.

page 348

Train and Tram Detection

ONLINE LOOK FOR MORE INFO

Objective:
To detect and locate a train or tram in a tunnel

page 354

Cargo Positioning

ONLINE LOOK FOR MORE INFO

Objective:
To detect and position cargo on a truck bed

page 354

Automobile Detection in Drive-Through

ONLINE LOOK FOR MORE INFO

Objective:
To detect the presence of large moving or stationary objects, regardless of shape or color.

page 354

Applications

Vision Applications

Label Alignment Inspection

ONLINE LOOK FOR MORE INFO page 364

Objective: To verify that each bottle has a label applied and that each label is applied straight.

Date/Lot Code Inspection

ONLINE LOOK FOR MORE INFO page 364

Objective: To verify each package has a date/lot code printed on it.

Punch Hole Inspection

ONLINE LOOK FOR MORE INFO page 364

Objective: To verify that the expected number of holes exist on a small metal part.

Vial Stopper Inspection

ONLINE LOOK FOR MORE INFO page 364

Objective: To ensure that a stopper is properly inserted as each vial leaves the filling station

Part Flaw Detection

ONLINE LOOK FOR MORE INFO page 364

Objective: To detect bent or missing connectors, and make sure electronic components are correctly oriented.

Intelligent Mail Bar Code (IMB) Reading

ONLINE LOOK FOR MORE INFO page 364

Objective: To sort mail by reading the information encoded in the bar code.

Lot Code Inspection

ONLINE LOOK FOR MORE INFO page 364

Objective: To verify that a readable lot code is present on the chip.

Pharmaceutical Insert Verification

ONLINE LOOK FOR MORE INFO page 364

Objective: To read and verify data matrix code on the documentation prior to the final packaging process.

Vial Fill Level and Cap Seal Inspection

ONLINE LOOK FOR MORE INFO page 370

Objective: To rapidly verify that vials are filled to the correct level and that the vial caps are correctly aligned.

Stamped Metal Pin Inspection

ONLINE LOOK FOR MORE INFO page 370

Objective: To check for correct count, straightness and pitch of connector pins on a stamped metal subassembly.

Color Inspection and Verification

ONLINE LOOK FOR MORE INFO page 370

Objective: To inspect pour spouts for correct insertion and color.

Capping and Fill Inspection

ONLINE LOOK FOR MORE INFO page 370

Objective: To make sure bottles are filled and capped properly.

Verification of Two Bar Codes on a Part

ONLINE LOOK FOR MORE INFO page 370

Objective: To read and verify 1D and 2D bar codes on a part.

Product ID and Lot Control

ONLINE LOOK FOR MORE INFO page 370

Objective: To track a batch of a pharmaceutical product.

Label Inspection in a Wet Environment

ONLINE LOOK FOR MORE INFO page 370

Objective: To confirm that each bottle in a wet environment has a label in the correct position.

2D Stamped Bar Code Verification

ONLINE LOOK FOR MORE INFO page 370

Objective: To detect and verify a dot-peened bar code on a metal part.

Wireless Applications

Preventative Maintenance

ONLINE LOOK FOR MORE INFO

page 393

Objective: To gather I/O data such as temperature and vibration on a mobile Automated Storage and Retrieval System (AS/RS) crane motor.

Warehouse Door

ONLINE LOOK FOR MORE INFO

page 391

Objective: To control the routing of an Automated Guided Vehicle (AGV) through a facility a *Flex*Node is positioned at each door.

Report Activated Emergency Shower Location

ONLINE LOOK FOR MORE INFO

page 390

Objective: To alert management when and where an emergency shower has been activated.

Rotary Bottle Filler Monitoring

ONLINE LOOK FOR MORE INFO

page 392

Objective: To monitor fill level, temperature and pressure to determine when to activate the inflow into the tank.

Gated Community Entry

ONLINE LOOK FOR MORE INFO

page 394

Objective: To open/close gates by detecting presence/absence of vehicles using a wireless M-GAGE Node.

Call for Parts (Flooring Monitoring)

ONLINE LOOK FOR MORE INFO

page 391

Objective: To allow operators to call forklift drivers to deliver additional parts or remove completed assemblies.

Energy Management

ONLINE LOOK FOR MORE INFO

page 390

Objective: To control and optimize energy consumption by turning on and off industrial fans and air movers.

Pick-to-Light

ONLINE LOOK FOR MORE INFO

page 391

Objective: To deploy a wireless pick-to-light system using a *Flex*Node equipped with low-power EZ-LIGHT models.

Environmental Monitoring

ONLINE LOOK FOR MORE INFO

page 393

Objective: To maintain optimal temperature and relative humidity using a wireless Node.

Process Tank Level Monitoring

ONLINE LOOK FOR MORE INFO

page 390

Objective: To maintain optimal fill level with a *Flex*Power Node and power-optimized ultrasonic sensor.

Valve Temperature Monitoring in a Steam Power Plant

ONLINE LOOK FOR MORE INFO

page 393

Objective: To monitor the valve temperature to identify possible energy losses and schedule repairs.

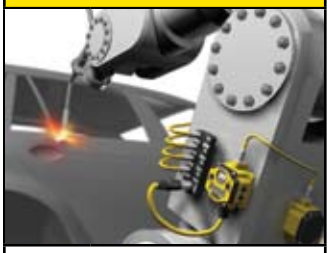
Failing Conduit Replacement

ONLINE LOOK FOR MORE INFO

page 385

Objective: To replace failing wired systems with a Node and Gateway pair.

Robotics Retrofit



ONLINE LOOK FOR MORE INFO

page 390

Objective: To eliminate the need for slip rings using a *Flex*Node to capture data onboard a moving robot.

HVAC Control

ONLINE LOOK FOR MORE INFO

page 390

Objective: To manage energy by monitoring the HVAC system and identifying areas where improved efficiency is possible.

Tank Level Pressure

ONLINE LOOK FOR MORE INFO

page 390

Objective: To maintain tank levels using a submersible pressure sensor and a *Flex*Node.

Automated Parts System

ONLINE LOOK FOR MORE INFO

page 391

Objective: To schedule pick up of a pallet by an AGV simply by pressing a button at a workstation.

Applications

Indicator & Actuator Applications

Machine Status Indication

ONLINE LOOK FOR MORE INFO page 428

Objective: To clearly indicate where in the process the machine is, and when the machine needs attention.

Pump Panel Status Indication

ONLINE LOOK FOR MORE INFO page 428

Objective: To use multiple lights and audible alert to communicate pump status, even from a distance.

Checkout Lane Status Indication

ONLINE LOOK FOR MORE INFO page 427

Objective: To identify which grocery store lanes are open, which are closed and which are about to close.

Conveyor Jam detection

ONLINE LOOK FOR MORE INFO page 427

Objective: To use an indicator light and audible alert to signal a conveyor jam.

Part Loaded Indicator

ONLINE LOOK FOR MORE INFO page 427

Objective: To signal to an operator that a part is placed correctly, without leaving the station.

Process Inspection Indicator

ONLINE LOOK FOR MORE INFO page 427

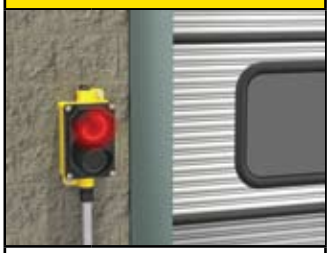
Objective: To allow an inspector to monitor the pass/fail reading of several sensors at the same time.

Remote Level Indication

ONLINE LOOK FOR MORE INFO page 427

Objective: To alert the operator that a sensor has detected that the content level is running low.

Traffic Control



ONLINE LOOK FOR MORE INFO page 440

Objective: To indicate the status of a loading dock.

Call for Parts

ONLINE LOOK FOR MORE INFO page 427

Objective: To alert personal to refill bins before parts are depleted.

Incorrect Pick Signal

ONLINE LOOK FOR MORE INFO page 444

Objective: To indicate whether the operator is picking from the correct bin or wrong bin.

Wide Bin Confirmation

ONLINE LOOK FOR MORE INFO page 444

Objective: To provide compact part-pick confirmation for a shelf with a wide opening.

Call for Service

ONLINE LOOK FOR MORE INFO page 444

Objective: To signal and indicate that service is required using a hanging indicator and push button.

Enclosure Lighting

ONLINE LOOK FOR MORE INFO page 405

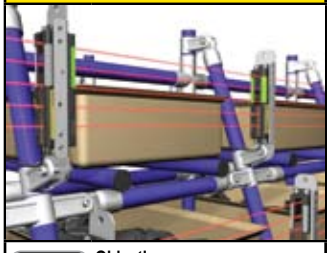
Objective: To provide bright, even illumination where space is limited.

Order Fulfillment

ONLINE LOOK FOR MORE INFO page 448

Objective: To guide a packer to the next item in an order and to confirm the pick.

Long Bin Pick-to-Light



ONLINE LOOK FOR MORE INFO page 450

Objective: To provide pick-to-light sensing for bins that extend beyond the rack.

Part Pick Verification

ONLINE LOOK FOR MORE INFO page 453

Objective: To indicate which part to pick for an assembly and to verify the pick is done.

Machine Safety Applications

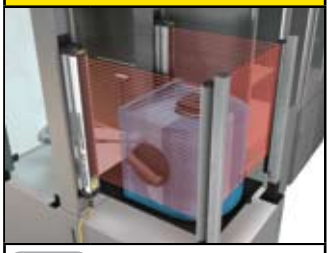
Personnel Protection with Fixed Blanking

ONLINE LOOK FOR MORE INFO

page 469

Objective:
To protect hands and fingers from the hazardous parts of a carton erector.

Guarding in ESD-Sensitive Environment

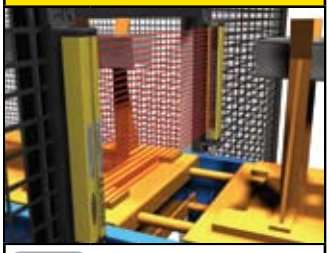


ONLINE LOOK FOR MORE INFO

page 469

Objective:
To guard a wafer cell in an environment sensitive to electrostatic discharge.

Safe Material Access



ONLINE LOOK FOR MORE INFO

page 469

Objective:
To prevent injury while allowing materials into a process.

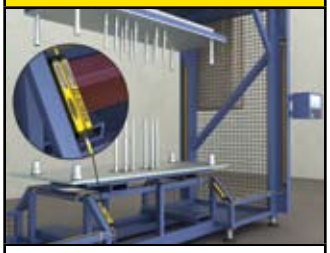
Perimeter Guarding

ONLINE LOOK FOR MORE INFO

page 469

Objective:
To combine a light screen and mirrors to guard access to a work cell.

Vertical and Horizontal Guarding

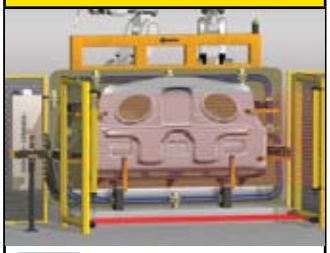


ONLINE LOOK FOR MORE INFO

page 469

Objective:
Guarding of two sides of machine because of separate operator load and unload stations.

Weld Cell Protection



ONLINE LOOK FOR MORE INFO

page 469

Objective:
To protect operators in semi-automated operations involving the manual feeding and/or removal of parts.

L-Configured Guarding

ONLINE LOOK FOR MORE INFO

page 469

Objective:
To link multiple light screens to safeguard a robotic cell.

Small Machine Guarding

ONLINE LOOK FOR MORE INFO

page 481

Objective:
To provide low-profile, point-of-operation guarding for small machinery.

U-Configured Guarding

ONLINE LOOK FOR MORE INFO

page 481

Objective:
To guard multiple sides of a machine without overlapping light curtains.

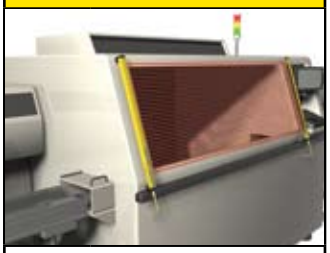
L-Configured Guarding without Overlapping

ONLINE LOOK FOR MORE INFO

page 481

Objective:
To provide continual sensing with no gaps.

Lower-Risk Machine Guarding



ONLINE LOOK FOR MORE INFO

page 489

Objective:
To provide guarding for a lower-risk application.

Lower-Risk Machine Guarding

ONLINE LOOK FOR MORE INFO

page 489

Objective:
To protect personnel from a machine that can cause slight injuries.

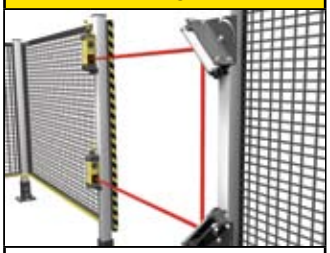
Perimeter Guarding

ONLINE LOOK FOR MORE INFO

page 494

Objective:
To shut off the hazardous motion of a tube bender when someone enters the cell.

Single-Point Access Guarding



ONLINE LOOK FOR MORE INFO

page 494

Objective:
To prevent personnel from accessing a hazardous area.

Entry/Exit Guarding with Muting

ONLINE LOOK FOR MORE INFO

page 502

Objective:
To prevent personnel from accessing a hazardous area.

Explosive Environment Point-of-Operation Guarding

ONLINE LOOK FOR MORE INFO

page 494

Objective:
To protect hands from a hazard while allowing material to pass through, by spacing individual Points as needed.

Applications

Machine Safety Applications

Moving Door Monitoring

ONLINE LOOK FOR MORE INFO

Objective:
To prevent passengers from being struck by closing doors.

page 494

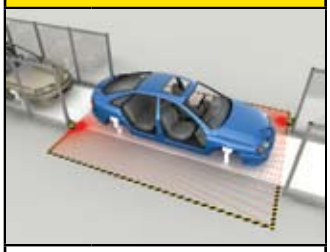
Explosive Environment Guarding with Muting

ONLINE LOOK FOR MORE INFO

Objective:
To provide entry/exit guarding and muting, using Points in an explosive environment.

page 494

Monitoring Access to an Assembly Line



ONLINE LOOK FOR MORE INFO

Objective:
To detect the presence/absence of objects or personnel as vehicles move along an assembly line.

page 503

Collision Avoidance

ONLINE LOOK FOR MORE INFO

Objective:
To provide collision avoidance for automated guided vehicle (AGV).

page 503

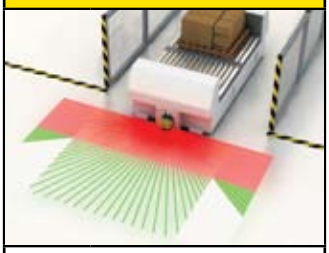
Two-Zone Monitoring

ONLINE LOOK FOR MORE INFO

Objective:
To detect the approach of personnel to each of two operator work stations of a robotic cell.

page 503

AGV Turn Clearance



ONLINE LOOK FOR MORE INFO

Objective:
To detect the presence of personnel or objects in the path of the automated guided vehicle (AGV).

page 503

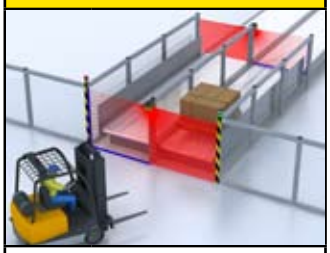
Point-of-Operation Guarding

ONLINE LOOK FOR MORE INFO

Objective:
To detect a hand, arm or entire body using reference container monitoring.

page 503

Whole Body Detection



ONLINE LOOK FOR MORE INFO

Objective:
To safeguard a pallet load/unload station using two scanners with field pair switch over.

page 503

Monitoring of Multiple Safety Devices

ONLINE LOOK FOR MORE INFO

Objective:
To provide monitoring of safety light grids, interlock switches, E-Stop button and a run bar with one safety controller.

page 526

Monitoring of Multiple Safety Devices

ONLINE LOOK FOR MORE INFO

Objective:
To monitor a safety light screen, self-checking touch buttons and an E-Stop button with one safety controller.

page 526

Emergency Stop Monitoring

ONLINE LOOK FOR MORE INFO

Objective:
To stop a machine's operation in an emergency, using a module with three output switching channels.

page 531

Emergency Stop Monitoring

ONLINE LOOK FOR MORE INFO

Objective:
To stop a machine's operation in an emergency, using a module with four output switching channels.

page 531

Gate Monitoring

ONLINE LOOK FOR MORE INFO

Objective:
To monitor a door-guarding switch, whether the switch is mechanical or magnetic.

page 523

Mat Monitoring

ONLINE LOOK FOR MORE INFO

Objective:
To monitor a safety mat that provides area guarding by responding to pressure.

page 541

Safe Material Access

ONLINE LOOK FOR MORE INFO

Objective:
To prevent injury while allowing material into a process.

page 523

Two-Hand Control Monitoring

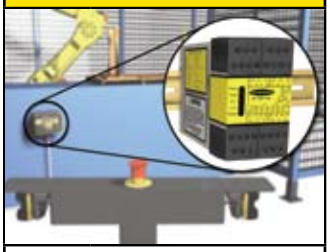
ONLINE LOOK FOR MORE INFO

Objective:
To monitor any actuation device pair, using a module with two redundant output contacts.

page 554

Machine Safety Applications

Two-Hand Control Monitoring



ONLINE LOOK FOR MORE INFO
page 554

Objective:
To monitor any actuation device pair, using a module with four redundant output contacts.

Two-Hand Control Monitoring with Muting

ONLINE LOOK FOR MORE INFO
page 554

Objective:
To use a two-hand control to start a cycle and mute during the cycle's safe portion.

Door Monitoring

ONLINE LOOK FOR MORE INFO
page 507

Objective:
To provide door guarding using compact, barrel shaped interlocking switches.

Gate Monitoring

ONLINE LOOK FOR MORE INFO
page 507

Objective:
To monitor the position of a swing gate using a pair of interlocking switches.

Door Monitoring

ONLINE LOOK FOR MORE INFO
page 507

Objective:
To provide door guarding in an explosive environment, using fiber optic switches.

Door Monitoring

ONLINE LOOK FOR MORE INFO
page 507

Objective:
To provide door guarding in an environment cleaned with chemicals, using a fiber optic switch.

Door Monitoring

ONLINE LOOK FOR MORE INFO
page 507

Objective:
To safeguard a door in an area with heavy machine traffic.

Swinging Gate Monitoring

ONLINE LOOK FOR MORE INFO
page 572

Objective:
To safeguard a hazard with a guard, gate or door that is mounted on a hinge.

Gate Monitoring

ONLINE LOOK FOR MORE INFO
page 572

Objective:
To prevent trapping or crushing by protecting an interlocked breakaway guard with an integral hinge.

Switch Door Locking

ONLINE LOOK FOR MORE INFO
page 587

Objective:
To lock out an area until a machine's hazardous motion stops.

Sliding Door Monitoring

ONLINE LOOK FOR MORE INFO
page 587

Objective:
To instantly stop a hazardous machine when sliding door is opened.

Emergency Stopping

ONLINE LOOK FOR MORE INFO
page 507

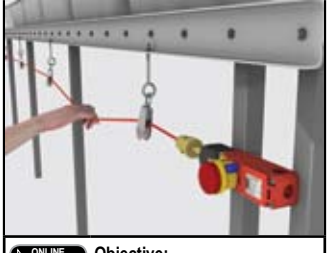
Objective:
To instantly stop the hazardous motion of a conveyor from multiple points, using a heavy-duty switch.

Emergency Stopping

ONLINE LOOK FOR MORE INFO
page 605

Objective:
To instantly stop the hazardous motion of a conveyor from multiple points, using a center-mounted switch.

Emergency Stopping



ONLINE LOOK FOR MORE INFO
page 605

Objective:
To instantly stop the hazardous motion of a conveyor from multiple points, using an end-mounted switch.

Emergency Stopping

ONLINE LOOK FOR MORE INFO
page 605

Objective:
To instantly stop the hazardous motion of a machine from a safe distance.

Emergency Stopping

ONLINE LOOK FOR MORE INFO
page 599

Objective:
To instantly stop the hazardous motion of a machine from a safe distance.