

# Industrial Sensor Solutions

New & Key Catalog - Vol. 8

**Think Optex Sensors**  
 Revolutionary Products. Reliable Solutions.



Incredibly Small  
 CD22 Laser  
 Measurement Sensors  
 Pg. 2



## Reliable Background Suppression Laser Sensor

BGS-DLT Series - Page 8



## Superior Transparent Object Detection

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## Automatic RGB Color / Mark Sensing

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**CD22 Series - CMOS Displacement Measurement Laser**

# Amazingly Small & Accurate

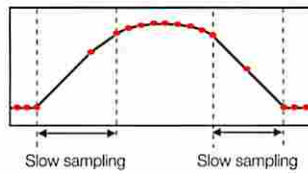
- ✔ The perfect choice for high accuracy detection of positioning, distance, thickness, flatness, stroke, depth detection
- ✔ 1µm accuracy (CD22-15)
- ✔ Detects most surfaces from black rubber to reflective metals
- ✔ Available with light weight aluminum housing or stainless steel
- ✔ RS-485 serial output versions available
- ✔ Programming functions include: zero reset, zero shift, 3 teach modes, hold and clamp alarm, and multiple function input



### Easy to Read & Setup

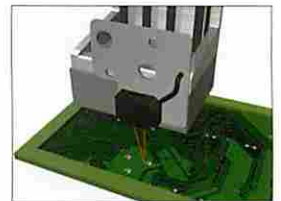


### Automatic Sampling



Gets correct shape by automatically adjusting sampling speed.

### Ideal for Small Spaces



Housing	Analog, Digital Output (a) / Serial	Part Number with M12 5 Pin Male Pigtail			
Aluminum Housing	4-20mA + 1CH	CD22-15AM12	CD22-35AM12	CD22-100AM12	CD22-100AM122
	0-10VDC + 1CH	CD22-15VM12	CD22-35VM12	CD22-100VM12	CD22-100VM122
	RS485	CD22-15-485M12	CD22-35-485M12	CD22-100-485M12	CD22-100-485M122
Stainless Steel Housing	4-20mA + 1CH	CD22M-15AM12	CD22M-35AM12	CD22M-100AM12	CD22M-100AM122
	0-10VDC + 1CH	CD22M-15VM12	CD22M-35VM12	CD22M-100VM12	CD22M-100VM122
	RS485	CD22M-15-485M12	CD22M-35-485M12	CD22M-100-485M12	
Measurement Range		15mm ±5mm	35mm ±15mm		100mm ±50mm
Measurement Window		10mm to 20mm	20mm to 50mm		50mm to 150mm
Spot Size at the Center		500µm x 700µm	450µm x 800µm		600µm x 700µm
Linearity		0.1% of F.S.			
Repeatability		1µm	6µm		20µm
Sampling Period		500µs / 1000µs / 2000µs / 4000µs / Auto			
Temperature Drift		±0.02% / °C		±0.05% / °C	
Light Source		Red laser diode (wavelength 655nm)			
FDA Laser Class		Max. output 390µW		Max. output: 1mW	
		Class II			

(a) Digital output is programmable NPN or PNP

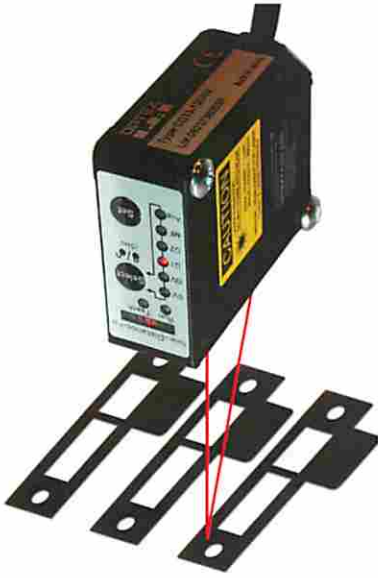
Connection Cable with M12 5 Pin Connector	
2m Length	M12-FS5-PVC-2M-BLK
5m Length	M12-FS5-PVC-5M-BLK
2m w/Male-Female	M12-FS5-M55-PVC-2M-BLK

Sensor Power Supply and Output Specification:		
Analog Output	4-20mA	0 to 10VDC
Power Supply	12 to 24VDC ±10%	18 to 24VDC ±10%
Max Load Impedance	300 Ω	
Output Impedance		100 Ω
Digital Output	1CH programmable NPN or PNP	

Learn more at: [www.optex-ramco.com/cd22](http://www.optex-ramco.com/cd22)

## CD33 Series - CMOS Displacement Measurement Laser

# Intuitive & Cost Effective



- ✓ Compact and lightweight cost-effective CMOS displacement measurement
- ✓ Diffuse mode detects warpage, sagging, profile of all targets including rubber
- ✓ Available with RS-422 serial communications and easy-to-use setup software
- ✓ Available with 2CH digital output for high precision comparator output
- ✓ Wide range of sensing distances up to 400mm (15.6")
- ✓ Programming functions include: span adjust, multiple function input, remote teach, sample hold
- ✓ Available in two versions: Diffuse (CD33) or specular (CD33-L type)

Housing	Part Number with 2m Cable Connection				
2CH NPN + 4-20mA	CD33-30NA	CD33-50NA	CD33-85NA	CD33-120NA	CD33-250NA
2CH NPN + 0-10VDC	CD33-30NV	CD33-50NV	CD33-85NV	CD33-120NV	CD33-250NV
1CH NPN + RS422	CD33-30N-422	CD33-50N-422	CD33-85N-422	CD33-120N-422	CD33-250N-422
2CH PNP + 4-20mA	CD33-30PA	CD33-50PA	CD33-85PA	CD33-120PA	CD33-250PA
2CH PNP + 0-10VDC	CD33-30PV	CD33-50PV	CD33-85PV	CD33-120PV	CD33-250PV
1CH PNP + RS422	CD33-30P-422	CD33-50P-422	CD33-85P-422	CD33-120P-422	CD33-250P-422
2CH NPN	CD33-30N	CD33-50N	CD33-85N	CD33-120N	CD33-250N
2CH PNP	CD33-30P	CD33-50P	CD33-85P	CD33-120P	CD33-250P
Measurement Range	30mm ±4mm	50mm ±10mm	85mm ±20mm	120mm ±60mm	250mm ±150mm
Measurement Window	26 to 34mm	40 to 60mm	65 to 60mm	60 to 180mm	100 to 400mm
Spot Size - Center Distance	0.1µm x 0.1µm	0.5µm x 0.1µm	0.75µm x 1.25µm	1.0µm x 1.5µm	1.75µm x 3.5 µm
Linearity	0.1% of F.S.				
Resolution - Fast	4µm	8µm	15µm	45µm	100µm
Resolution - Other	2µm	5µm	10µm	30µm	75µm
Temperature Drift	0.08% of F.S. /°C				
Light Source / Peak Power	650nm / 1mW				

All models available in quick disconnect version

Quick disconnect cables analog output versions CD33CN-S 2 meter hiflex cable CD33CN-SS 5 meter hiflex cable

Quick disconnect cables serial output versions DOL-1208-G02MF 2 meter cable DOL-1208-G05MF 5 meter cable



Measuring Lumber Thickness



Verifying Pop-Top Presence



Measuring CV Joint Deflection

Learn more at: [www.optex-ramco.com/cd33](http://www.optex-ramco.com/cd33)

CD33-L specular models at: [www.optex-ramco.com/cd33l](http://www.optex-ramco.com/cd33l)

View Our Full Product Line at:  
[www.Optex-Ramco.com](http://www.Optex-Ramco.com)

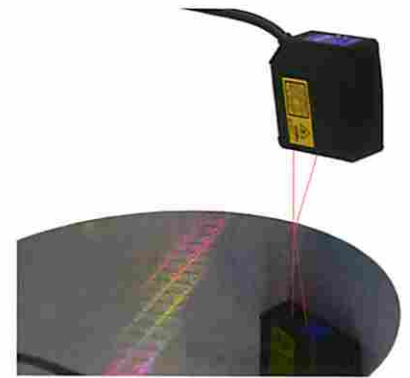
**THINK OPTEX FOR**  
LASER MEASUREMENT SOLUTIONS

**3**

## CD5 Series - Linear Image Displacement Measurement Laser

# Unwavering Measurement

- ✓ Best-in-class resolution and linearity measurement laser
- ✓ Direct connection to PC/PLC via RS-422 serial communication
- ✓ Up to 3 sensing heads can connect to versatile controller with color LCD for levelness, contortion, shifting, and level difference applications
- ✓ Available in specular type for high-accuracy glass thickness measurement
- ✓ Narrow & wide beam models available for measurement of many surfaces



Two laser leads to measure thickness of transparent sheet



Measuring of rubber sheet thickness at calendar roller



Measuring angle of rotation on aircraft and automotive parts

	CD5-L25	CD5-LW25	CD5-L25A	CD5-LW25A	CD5-30		CD5-W30		CD5-30A		CD5-W30A	
	Specular		Specular		Diffuse	Specular	Diffuse	Specular	Diffuse	Specular	Diffuse	Specular
Measurement Range	25mm ±1mm		25mm ±1mm		30mm ±5mm	26.1mm ±2.5mm	30mm ±5mm	26.1mm ±2.5mm	30mm ±5mm	26.1mm ±2.5mm	30mm ±5mm	26.1mm ±2.5mm
Measurement Window	24 to 26mm		24 to 26mm		25 to 35mm	23.6 to 28.6mm	25 to 35mm	23.6 to 28.6mm	25 to 35mm	23.6 to 28.6mm	25 to 35mm	23.6 to 28.6mm
Approx Spot Size at Center	25 x 35µm	100 x 700µm	25 x 35µm	100 x 700µm	30 x 100µm		260 x 1000µm		30 x 100µm		260 x 1000µm	
Linearity	0.08% of F.S.											
Repeatability	0.02µm		0.37µm		0.2µm	0.1µm	2µm	0.1µm	0.46µm	0.23µm	46µm	0.23µm
Temperature Drift	±0.01% / °C	±0.05% / °C	±0.01% / °C	±0.05% / °C	±0.01% / °C		±0.01% / °C					
Laser Diode Output	650nm / 390µW				650nm / 1mW		658nm / 1mW		650nm / 390µW		650nm / 1mW	

	CD5-85		CD5-W85		CD5-150	CD5-W150	CD5-W350	CD5-W500	CD5-W2000
	Diffuse	Specular	Diffuse	Specular			Diffuse		
Measurement Range	85mm ±20mm	82.3mm ±10mm	85mm ±20mm	82.3mm ±10mm		150mm ±40mm	350mm ±100mm	500mm ±200mm	2,000mm ±500mm
Measurement Window	65 to 105mm	72.3 to 92.3mm	65 to 105mm	72.3 to 92.3mm		110 to 190mm	250 to 450mm	300 to 700mm	1,500 to 2,500mm
Approx Spot Size at Center	70 x 29µm		260 x 1200µm		ø180µm	330 x 1600µm	700 x 2400µm	1,000 x 3700µm	2,100 x 7800µm
Linearity	0.05% of F.S.	0.08% of F.S.	0.05% of F.S.	0.08% of F.S.	0.05% of F.S.		0.08% of F.S.		0.1% of F.S.
Repeatability	1µm	0.5µm	1µm	0.5µm	2µm		5µm	10µm	30µm
Temperature Drift	±0.01% / °C								
Laser Diode Output	650nm / 1mW		658nm / 1mW		650nm / 1mW		658nm / 1mW		650nm / 5mW

Stand Alone or UQ1 Connection Cables DOL-1212-G05M 5 meter cable DOL-1212-G10M 10 Meter Cable

Learn more at: [www.optex-ramco.com/cd5](http://www.optex-ramco.com/cd5)

**4** **THINK OPTEX FOR**  
**LASER MEASUREMENT SOLUTIONS**

To order or for support:  
**1-800-280-6933**

## CD5 Control - Multi-Measurement Controller for CD5 Series

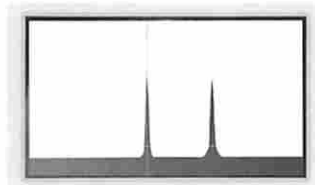
# Ultimate Flexibility



- ✓ 3 CD5 series laser heads can be connected to one controller
- ✓ Multi-calculation functions built in such as thickness, levelness, warpage, level difference, shifting, etc.
- ✓ 4.3" LCD display & back-lit 10 key pad for quick & easy set-up
- ✓ Wave form monitoring perfect for verification of sensing position
- ✓ Data navigator software available for PC set-up and data acquisition

Connection cable DSL-1212-G02M 2 meter robotic cable DSL-1212-G05M 5 meter robotic cable can be extended up to 50 meters

	CD5A-N	CD5A-P
Supply Voltage	12-24VDC	
Sensor Head Inputs	3 each - Any mix	
Analog Output	-10 to +10 VDC and 4 to 20mA	
Control Output	5 each NPN	5 each PNP
Alarm Output	NPN	PNP
Connection Ports	RS-232C and USB	
Program Storage Banks	16 each via 10 Key panel / external input / RS-232C	



CD5 Controller screen with waveform monitor function for simple set-up



Navigation software allows data export to .csv file

Learn more at: [www.optex-ramco.com/cd5](http://www.optex-ramco.com/cd5)



## UQ-1 Series Control Unit for Displacement Sensors Easily Connect with Mitsubishi PLC's

- ✓ Automatic communication between Optex CD5/CD33 & Mitsubishi Q PLC's
- ✓ Very fast response times (min. 100 micro seconds) independent of PLC scan time
- ✓ Connect up to two heads to one controller
- ✓ Easy access software speeds up setup time
- ✓ Algorithms for averaging, leveling, step height, etc. built in

Learn more at: [www.optex-ramco.com/uq1](http://www.optex-ramco.com/uq1)

# LS Series - 2D Displacement Measurement Laser

## Revolutionary 2D Measurement



- ✓ High precision measurement of height and width
- ✓ Diverse range of measurement functions: Height, position, edge count, tilt, diameter, etc.
- ✓ 27mm line beam with up to 2 micron repeatability in the Z axis
- ✓ Sampling period: 0.5 ms (max speed)
- ✓ Intuitive software included for easy configuration of settings & data acquisition

### Four Easy Setup Steps:

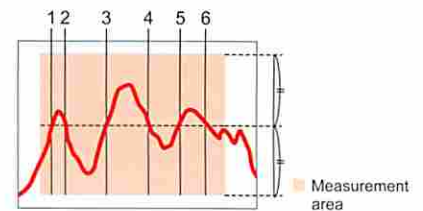


- 1 Imaging
- 2 Profile
- 3 Area measurement & calculation
- 4 Results judgment and output

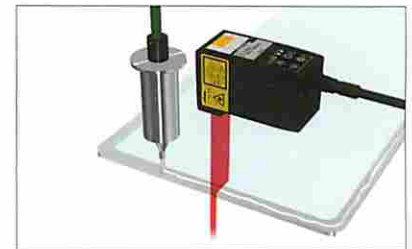
### Intuitive Software Included



### Diverse Range of Measurement Functions



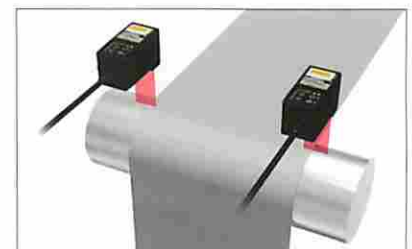
	LS-100CN	LS-100CP
Measurement Range	100mm ±25mm	
Light Source	Red laser 655nm wavelength, 1mW max	
Laser Class	Class II FDA	
Spot Size	0.3 x 32mm	
Linearity of Z Axis	±50 µm (±0.1% of F.S.)	
Repeatability of Z Axis	2µm	
Resolution of X Axis	25µm	
Sampling Period	Max. speed 0.5ms / typical 5ms	
Display	Dot matrix display	
External Input (Programmable)	Bank select, trigger, hold, reset, laser emission stop, and offset	
Control Output	3 each NPN	3 each NPN
Analog Output	4 to 20mA, out of measurement: 24mA	
Communication I/F	RS-485 half duplex (9.6 kbps to 4.0 Mbps)	



Monitoring Sealant Profile

### Connection Cables

STL-OH12-G02M	2m main cable for power, I/O, and analog
STL-OH12-G05M	5m main cable for power, I/O, and analog
STL-OH12-G10M	10m main cable for power, I/O, and analog
DSL-DH06-G1MB	1m RS-485 to USB cable for software
DOL-SH06-G02M	2m RS-485 communication cable flying leads
DOL-SH06-G05M	5m RS-485 communication cable flying
DOL-SH06-G010M	10m RS-485 communication cable flying leads



Web Thickness & Guiding

Learn more at: [www.optex-ramco.com/ls](http://www.optex-ramco.com/ls)



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To order or for support:  
**1-800-280-6933**

**BGS-HL Series - Ultra High Resolution Laser Sensor**

# Highest Accuracy Background Suppression



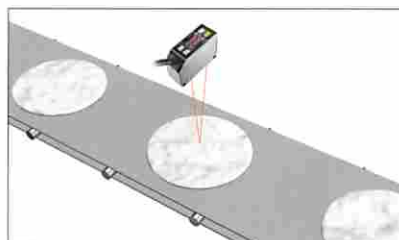
- ✔ Detection of parts position within 80µm accuracy is possible.
- ✔ High resolution electronic shutter allows sensing of all targets with low or high reflectance surfaces
- ✔ Bright LED display aids in set-up and monitoring
- ✔ Programmable hysteresis provides enhanced sensing resolution in all applications
- ✔ Compact and light weight, ideal for mounting the BGS-HL on robots

2m Cable Type	Alum Housing	BGS-HL05T	BGS-HL25T	BGS-HL25T2
	SUS Housing	BGS-HLM05T	BGS-HLM25T	BGS-HLM25T2
M8 4 Pin QD	Alum Housing	BGS-HL05TC	BGS-HL25TC	BGS-HL25TC2
	SUS Housing	BGS-HLM05TC	BGS-HLM25TC	BGS-HLM25TC2
Adjustable Sensing Range	20 to 50mm		50 to 250mm	
Digital Display Units	0 to 30mm		0 to 200mm	
Repeatability	0.01mm		0.1mm	
Threshold Setting Method	Push button teach or remote teach via external wire			
Minimum Detectable Height Difference	0.08mm		0.8mm	
Response Time	1.5 ~ 7.5ms		3 ~ 15ms	
Hysteresis	0 ~ 22.49mm		0 ~ 149.49mm	
Light Source	Red laser diode 655nm			
	390µW max.		1mW max.	
Spot Size	Ø 0.8mm		Ø 1.0mm	
Control Output	Programmable NPN or PNP			
Timer (Programmable)	On-delay, off-delay, or one-shot			
External Input (Programmable)	Laser off, teaching, sample & hold, one shot			
Includes Mounting Bracket	BEF-OD1-B for cable type / BEF-OD1A for QD type			

Use M8-F54-PVC-2M Cable for QD Type



Checking Part Orientation



Thin Part Detection on Conveyor



Missing O-Ring Detection

Learn more at: [www.optex-ramco.com/bgshl](http://www.optex-ramco.com/bgshl)

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[www.Optex-Ramco.com](http://www.Optex-Ramco.com)

**THINK OPTEX FOR  
LASER SENSOR SOLUTIONS**

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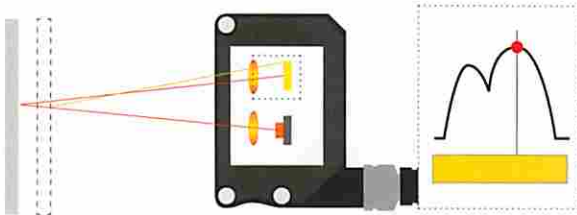
**BGS-DLT Series - Reliable Background Suppression**

# User Friendly PB Teach CMOS Laser



- ✔ High functionality with push-button and remote input teaching with fine adjustment
- ✔ For sensing all targets from black to highly reflective
- ✔ Versatile sensor for any background or foreground suppression regardless of material
- ✔ Not influenced by machine background
- ✔ Programming features include time delay, position and 1 pt & 2 pt teach modes

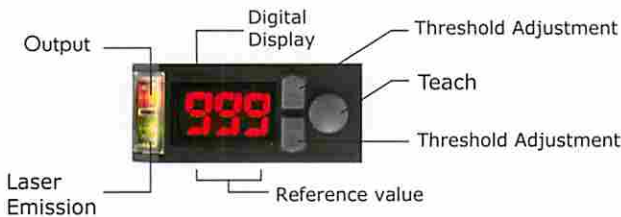
## More Accurate Detection with CMOS



The BGS-DLT Series utilizes a CMOS image sensors that detects light quantity at each pixel allowing for very accurate detection of peak position of the returned light

Background Suppression - Digital			
2M Cable	NPN	BGS-DL10TN	BGS-DL25TN
	PNP	BGS-DL10TP	BGS-DL25TP
M8 4P QD	NPN	BGS-DL10TCN	BGS-DL25TCN
	PNP	BGS-DL10TCP	BGS-DL25TCP
Adj. Sensing Range	40 to 100mm		100 to 250mm
Repeat Accuracy	0.2mm or less		0.3mm or less
Spot Size	1mm at 80mm		2mm at 200mm
Hysteresis	3% at 80mm		10% at 200mm
Response Time	1.5ms max (fixed sensitivity mode)		
Light Source	Red laser diode 650nm		
Peak Power	1mW 300s (IEC Class 2)		
FDA Class	Class II		
Sensitivity Adjustment	Pushbutton or remote wire teach with fine adjust buttons		
Supply Voltage	10 to 30 VDC		
Output Mode	Pushbutton programmable light-on / dark-on		

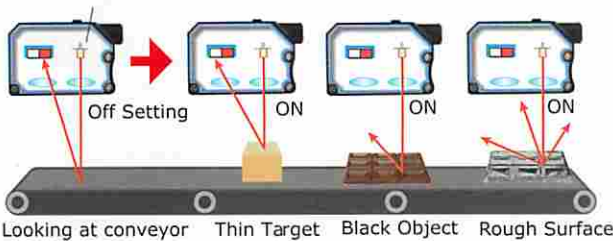
## Display with Digital Sensitivity Adjustment



Background Suppression - Manual Adjust				
2M Cable	NPN	BGS-DL10N	BGS-DL30N	BGS-DL70N
	PNP	BGS-DL10P	BGS-DL30P	BGS-DL70P
M8 4P QD	NPN	BGS-DL10CN	BGS-DL30CN	BGS-DL70CN
	PNP	BGS-DL10CP	BGS-DL30CP	BGS-DL70CP
Adj. Sensing Range	40 to 100	100 to 300mm	100 to 700mm	
Repeat Accuracy	0.2mm or less		0.3mm or less	
Spot Size	3mm at 80mm		6mm at 200mm	
Hysteresis	5% at 80mm	5% at 200mm	5% at 300mm	
Response Time	0.5ms			
Light Source	Red laser diode 650nm			
Peak Power	2mW max (IEC Class 2)		3mW max (IEC Class 2)	
FDA Class	Class II			
Sensitivity Adjustment	4-turn pot			
Supply Voltage	10 to 30 VDC			
Output Mode	Switch selectable light-on / dark-on			

Use M8-FS4-PVC-2M Cable for QD Type

## Foreground Suppression Mode



FGS Mode is designed for detecting thin or irregularly shaped targets on a consistent background such as a conveyor, nest, etc

Learn more at: [www.optex-ramco.com/bgsdlr](http://www.optex-ramco.com/bgsdlr)



# DR-Q Series - Transparent Object Detection

## Ultimate Transparent Object Detection

- ✔ Quick set-up with push-button and remote input teach with fine adjust
- ✔ High sensitivity allows for precise clear-on-clear sensing
- ✔ ASC circuit provides threshold correction for lens contamination
- ✔ Programming modes include time delay, threshold level setting, and ASC
- ✔ Good for all film, PET, glass, plastic, clam shell materials



		Polarized Retroreflective For Transparent (1) (2)	
2M Cable	NPN	DR-Q150TN	DR-Q400TN
	PNP	DR-Q150TP	DR-Q400TP
M8 4P QD	NPN	DR-Q150TCN	DR-Q400TCN
	PNP	DR-Q150TCP	DR-Q400TCP
Adjustable Sensing Range	0 to 1.5m		0 to 4m
Repeat Accuracy	0.3mm or less		0.5mm or less
Spot Size	15mm at 1.5m		20mm to 3.5mm
Response Time	0.7ms		
Light Source	Red laser diode 650nm		
Peak Power	2mW max 4µsec (IEC Class 2)		
FDA Class	Class II		
Sensitivity Adjustment	Pushbutton or remote wire teach with fine adjust buttons		
Supply Voltage	10 to 30 VDC		
Output Mode	Pushbutton programmable light-on / dark-on		
Mechanical	IP67, 50G		

Use M8-FS4-PVC-2M Cable for QD Type (1) P250F Reflector is included (2) Coaxial beam type

Learn more at: [www.optex-ramco.com/drq](http://www.optex-ramco.com/drq)

# ZL Series - General Purpose Laser Sensors

## Laser Sensors with Versatility

- ✔ Thrubeam model is rated for 30 meters
- ✔ Diffuse model can distinguish black & white at 400mm
- ✔ BGS model hysteresis is only 3%



		Thrubeam	Polarized Retroreflective (1)	Diffuse	Background Suppression	Background Suppression
2M Cable	NPN	ZT-L3000N	ZR-L1000N	ZD-L40N	BGS-ZL10N	BGS-ZL30N
	PNP	ZT-L3000P	ZR-L1000P	ZD-L40P	BGS-ZL10P	BGS-ZL30P
M8 4P QD	NPN	ZT-L3000CN	ZR-L1000CN	ZD-L40CN	BGS-ZL10CN	BGS-ZL30CN
	PNP	ZT-L3000CP	ZR-L1000CP	ZD-L40CP	BGS-ZL10CP	BGS-ZL30CP
Adjustable Sensing Range	30m		0.8 to 10m	400mm	20 to 100mm	50 to 300mm
Repeat Accuracy			0.5mm		0.2mm	0.3mm
Spot Size	30mm at 30m		12mm at 10m	2mm at 400mm	1mm at 100mm	1.5mm at 300mm
Hysteresis				20% at 400mm	3% (2)	5% (2)
Response Time	250µsec					
Light Source	Visible light laser 650nm					
Peak Power	390µ watt max		3mW max		4.7mW max	
FDA Class	Class II FDA					
Sensitivity Adjustment	1-turn pot			4-turn pot		
Supply Voltage	10 to 30 VDC					
Output Mode	Switch selectable light-on / dark-on					
Mechanical	IP67, 50G shock					

Use M8-FS4-PVC-2M Cable for QD Type

(1) P250F Reflector is included (2) target is white paper

Learn more at: [www.optex-ramco.com/zl](http://www.optex-ramco.com/zl)

## TOF Series - Time-Of-Flight Laser

# 3 Meter Background Suppression Sensing



- ✔ Time of flight technology provides very accurate detection regardless of object color and reflectivity
- ✔ 2mm repeat accuracy at 3 meter distance
- ✔ Dual independent output versions for on detection at 2 distances
- ✔ Available in BGS and retroreflective mode
- ✔ Dual laser system maintains consistent detection regardless of temperature changes

		Diffuse Reflective		Polarized Retro-Reflective
		1CH Output	2CH Output	1CH Output
Cable Type - 2m	NPN OUTPUT	TOF-3V300N1	TOF-3V300N	TOF-3V2000N
	PNP OUTPUT	TOF-3V300P1	TOF-3V300P	TOF-3V2000P
M12 5pin Swivel QD	NPN OUTPUT	TOF-3V300CN1	TOF-3V300CN	TOF-3V2000CN
	PNP OUTPUT	TOF-3V300CP1	TOF-3V300CP	TOF-3V2000CP
Adj. Sensing Range		3 meters (90% white target)		20 meters (V-61 reflector)
Detectable Target		Opaque from 6% (black) to 90% (white) reflectivity		V-61 reflector
Number of Digital Outputs		1	2	1
Light Source		Red laser 650nm / FDA Class I		
Spot Size		Ø12mm @ 3 meters		Ø50mm @ 20 meters
Optical Angle Deviation		0.5° (9 mrad) or less		

M12-FS5-PVC-2M-BLK cable for QD Type

Learn more at: [www.optex-ramco.com/tof](http://www.optex-ramco.com/tof)

## D Series - Retro and Thru-beam Lasers

# Long Distance Laser Sensing

- ✔ Super bright laser beam aids in long distance alignment
- ✔ Coaxial beam provides very tight laser beam for retro-reflective sensing



		Thru-beam		Polarized Retroreflective Coaxial Beam (1)
		2M Cable	NPN	DT-4000N
	PNP	DT-4000P	DR-500P	
M8 4P QD	NPN	DT-4000CN	DR-500CN	
	PNP	DT-4000CP	DR-500CP	
Adj. Sensing Range		40m		0 to 5m
Repeat Accuracy		0.5mm or less		
Spot Size		15mm at 5m		20mm at 3.5m
Response Time		0.5ms		
Light Source		Red laser diode 650nm		
Peak Power		2mW max 4s (IEC Class 2)		
FDA Class		Class II		
Sensitivity Adjustment		1-turn pot		
Supply Voltage		10 to 30 VDC		
Output Mode		Switch selectable light-on / dark-on		
Mechanical		IP67, 50G		

Use M8-FS4-PVC-2M Cable for QD Type

(1) P250F Reflector is included

Learn more at: [www.optex-ramco.com/d](http://www.optex-ramco.com/d)

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**E Series - Ultra-Compact Self-Contained Photoelectric**

# Ultra Small Amplifier Built-In Sensor

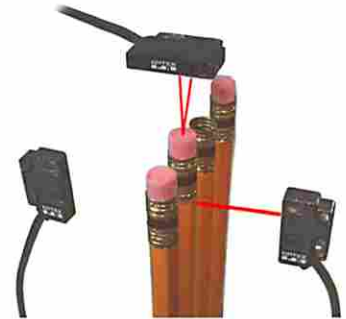


- ✔ Front sensing version is only 3.5mm thick
- ✔ Diffuse model up to 100mm distance
- ✔ Diffuse and convergent super side sense versions for flexible installation
- ✔ Available with M8 3 pin quick disconnect as a standard
- ✔ Operation indicator visible on the front and back of the sensor for quick output status confirmation

## Front Sensing Models

		Thrubeam	Convergent		Diffuse	
2M Cable	NPN-Light-On	ET-500NL	EL-08NL	EL-15NL	EL-30NL	ED-100NL
	NPN-Dark-On	ET-500ND	EL-08ND	EL-15ND	EL-30ND	ED-100ND
	PNP-Light-On	ET-500PL	EL-08PL	EL-15PL	EL-30PL	ED-100PL
	PNP-Dark-On	ET-500PD	EL-08PD	EL-15PD	EL-30PD	ED-100PD
150mm Pigtail M8 3P Male (1)	NPN-Light-On	ET-500NL3	EL-08NL3	EL-15NL3	EL-30NL3	ED-100NL3
	NPN-Dark-On	ET-500ND3	EL-08ND3	EL-15ND3	EL-30ND3	ED-100ND3
	PNP-Light-On	ET-500PL3	EL-08PL3	EL-15PL3	EL-30PL3	ED-100PL3
	PNP-Dark-On	ET-500PD3	EL-08PD3	EL-15PD3	EL-30PD3	ED-100PD3
Adjustable Sensing Range		500mm	3 to 8mm	2 to 15mm	5 to 30mm	100mm
Repeat Accuracy		0.3mm or less	0.2mm or less	0.3mm or less	0.8mm or less	2.5mm or less
Spot Size Diameter		140mm at 500mm	10mm at 8mm	10mm at 15mm	20mm at 30mm	60mm at 100mm
Hysteresis with White Paper			10%		15%	
Output Current		50mA max /24VDC				
Response Time		0.5ms				
Light Source		Red LED				
Sensitivity Adjustment		None				
Supply Voltage		12 to 24 VDC				
Mechanical		IP67, 1000m/S, X-Y-Z each for 2 hrs shock rating				

(1) Use M8-FS3-PVC-2M Cable



## Side Sensing Models

		Thrubeam	Convergent	Diffuse	
2M Cable	NPN-Light-On	ET-S500NL	EL-S15NL	ED-S30NL	
	NPN-Dark-On	ET-S500ND	EL-S15ND	ED-S30ND	
	PNP-Light-On	ET-S500PL	EL-S15PL	ED-S30PL	
	PNP-Dark-On	ET-S500PD	EL-S15PD	ED-S30PD	
150mm Pigtail M8 3P Male (1)	NPN-Light-On	ET-S500NL3	EL-S15NL3	ED-S30NL3	
	NPN-Dark-On	ET-S500ND3	EL-S15ND3	ED-S30ND3	
	PNP-Light-On	ET-S500PL3	EL-S15PL3	ED-S30PL3	
	PNP-Dark-On	ET-S500PD3	EL-S15PD3	ED-S30PD3	
Adjustable Sensing Range		500mm	2 to 15mm	30mm	
Repeat Accuracy		+/-0.1mm max			+/-0.05mm max
Spot Size Diameter		600mm at 500mm	2mm at 15mm	3mm at 30mm	
Hysteresis					10%
Output Current		50mA max /24VDC			
Response Time		0.250ms			0.5ms
Light Source		Red LED			
Sensitivity Adjustment		None			
Supply Voltage		12 to 24 VDC			
Mechanical		IP67, 1000m/S, X-Y-Z each for 2 hrs shock rating			

(1) Use M8-FS3-PVC-2M Cable

Diffuse side view detecting small automotive fuses in a tight space



Super thin profile allows mounting in tight areas

Learn more at: [www.optex-ramco.com/e](http://www.optex-ramco.com/e)

## Z Series General Purpose Photoelectric and BGS Sensors

# Wide Selection

- ✔ Complete sensing mode line up: BGS, transparent, divergent, and coaxial retroreflective
- ✔ ZR-QX type is ideal for PET bottles, transparent objects etc.
- ✔ BGS type is not influenced by background objects and has a 4 turn pot for precise adjustment
- ✔ ZR-X and ZR-QX Coaxial beam is perfect for detection of small targets



		Polarized Retroreflective Coaxial Beam Type (1)	Polarized Retro For Transparent Coaxial Beam Type (2)	Divergent	Background Suppression	
2M Cable	NPN	ZR-X250N	ZR-QX200N	ZD-W20N	BGS-Z10N	BGS-Z30N
	PNP	ZR-X250P	ZR-QX200P	ZD-W20P	BGS-Z10P	BGS-Z30P
M8 4P QD	NPN	ZR-X250CN	ZR-QX200CN	ZD-W20CN	BGS-Z10CN	BGS-Z30CN
	PNP	ZR-X250CP	ZR-QX200CP	ZD-W20CP	BGS-Z10CP	BGS-Z30CP
Adj. Sensing Range		0 to 2.5m	0 to 2m	180mm	20 to 100mm	50 to 300mm
Repeat Accuracy		0.5mm or less		1mm or less	0.3mm	0.5mm or less
Spot Size		60mm at 2m	60mm at 2m	30mm at 50mm	10mm at 100mm	30mm at 300mm
Hysteresis				20% max	3% max	5% max
Response Time		.250ms		.5ms max		
Light Source		Red LED				
Sensitivity Adjustment		1-turn pot		4-turn clutched pot		
Supply Voltage		10 to 30 VDC				
Output Mode		Switch selectable: light-on or dark-on				
Mechanical		IP67, 100G shock rating				

Use M8-FS4-PVC-2M Cable for QD Type

(1) V-61 Reflector is included  
(2) P250 Reflector Included

Learn more at: [www.optex-ramco.com/z](http://www.optex-ramco.com/z)

## Z3 Series Photoelectric Sensors

# Superior Detection Performance

- ✔ High power LED provides stable detection and better excess gain
- ✔ Four element LED helps reduce degradation over time.
- ✔ Bright output and stability indicators for better viewing of sensor status
- ✔ Decreased dead zone allows for better close range sensing applications



		Thrubeam	Polarized Retroreflective	Polarized Retro for Transparent	Limited-Reflective	Diffuse
2M Cable	NPN	Z3T-2500N	Z3R-400N	Z3R-Q200N	Z3D-L09N	Z3D-100N
	PNP	Z3T-2500P	Z3R-400P	Z3R-Q200P	Z3D-L09P	Z3D-100P
M8 4P QD	NPN	Z3T-2500CN	Z3R-400CN	Z3R-Q200CN	Z3D-L09CN	Z3D-100CN
	PNP	Z3T-2500CP	Z3R-400CP	Z3R-Q200CP	Z3D-L09CP	Z3D-100CP
Adjustable Sensing Range		25m	0.01 to 4m	0.01 to 2m	10 to 90mm	0 to 1m
Repeat Accuracy		0.2 mm	0.2 mm	0.2 mm	0.4 mm	0.4 mm
Spot Size		1800mm at 25m	280mm at 4m	140mm at 2m	8mm at 90mm	75mm at 1m
Hysteresis					10% max	20% max
Response Time		.5ms				
Light Source		Four element red LED, 632nm				
Sensitivity Adjustment		1-turn pot				

Use M8-FS4-PVC-2M Cable for QD Type

Learn more at: [www.optex-ramco.com/z3](http://www.optex-ramco.com/z3)

Y Series - Features Flexible Mounting

# Easy Mounting M18 Barrel with Two Outputs



- ✔ Two outputs include normally-open and normally-closed
- ✔ Connection styles include cable, M8 QD, or M12 pigtail
- ✔ YR-Q will detect all transparent targets including glass and plastic

		Thrubeam	Polarized Retroreflective (1)	Polarized Retro For Transparent (2)	Convergent	Diffuse	Background Suppression
2M Cable	NPN	YT-1180N	YR-140N	YR-Q39N	YD-L2N	YD-15N	BGS-Y8N
	PNP	YT-1180P	YR-140P	YR-Q39P	YD-L2P	YD-15P	BGS-Y8P
M8 4P QD	NPN	YT-1180CN	YR-140CN	YR-Q39CN	YD-L2CN	YD-15CN	BGS-Y8CN
	PNP	YT-1180CP	YR-140CP	YR-Q39CP	YD-L2CP	YD-15CP	BGS-Y8CP
Pigtail M12 4P	NPN	YT-1180N-M12	YR-140N-M12	YR-Q39N-M12	YD-L2N-M12	YD-15N-M12	BGS-Y8N-M12
	PNP	YT-1180P-M12	YR-140P-M12	YR-Q39P-M12	YD-L2P-M12	YD-15P-M12	BGS-Y8P-M12
Adjustable Sensing Range		30m	0.1m to 4m	0.1m to 1m	43mm	400mm	15mm to 200mm
Repeat Accuracy		1mm or less	0.5mm or less		0.5mm or less	1mm or less	
Spot Size			75mm at 3.5m	25mm at 1m	4.6mm at 80mm	12mm at 400mm	15mm at 200mm
Hysteresis			N/A		10% max	20% max	5% max
Response Time		.5 ms					
Light Source		Red LED					
Sensitivity Adjustment		Single turn					4-turn
Supply Voltage		10 TO 30 VDC					
Output Mode		2 outputs modes provided: light-on and dark-on					

Learn more at: [www.optex-ramco.com/y](http://www.optex-ramco.com/y)

Use M8-FS4-PVC-2M Cable for M8 QD Type  
Use M12-FS4-PVC-2M Cable for M12 QD Type

(1) V-61 Reflector is included  
(2) P45 Reflector Included

C2/C2-S Series - 18mm DC Tubular Sensors

# M18 Barrel Sensors with Adjustable Pot



- ✔ Seven models including background suppression - Axial and 90° sensing types
- ✔ Long distance! 20 meter thrubeam and 800mm diffuse
- ✔ Cost effective sensors are available in plastic and metal housings (see our website)

		Thrubeam	Polarized Retroreflective (1)	Non-Polarized Retroreflective (1)	Diffuse			Background Suppression	
Plastic Axial	2M Cable	NPN	C2TP-2000N	C2RP-F400N	C2RP-350N	C2DP-11N	C2DP-40N	C2DP-80N	BGS-CP30N
		PNP	C2TP-2000P	C2RP-F400P	C2RP-350P	C2DP-11P	C2DP-40P	C2DP-80P	BGS-CP30P
	M12 4P QD	NPN	C2TP-2000CN	C2RP-F400CN	C2RP-350CN	C2DP-11CN	C2DP-40CN	C2DP-80CN	BGS-CP30CN
		PNP	C2TP-2000CP	C2RP-F400CP	C2RP-350CP	C2DP-11CP	C2DP-40CP	C2DP-80CP	BGS-CP30CP
Plastic 90 Degree	2M Cable	NPN	C2TP-S2000N	C2RP-SF400N	C2RP-S350N	C2DP-S11N	C2DP-S40N	C2DP-S80N	
		PNP	C2TP-S2000P	C2RP-SF400P	C2RP-S350P	C2DP-S11P	C2DP-S40P	C2DP-S80P	
	M12 4P QD	NPN	C2TP-S2000CN	C2RP-SF400CN	C2RP-S350CN	C2DP-S11CN	C2DP-S40CN	C2DP-S80CN	
		PNP	C2TP-S2000CP	C2RP-SF400CP	C2RP-S350CP	C2DP-S11CP	C2DP-S40CP	C2DP-S80CP	
Adjustable Sensing Range		20m	0.01 to 4m	0.01 to 3.5m	110mm	400mm	800mm	20mm to 300mm	
Repeat Accuracy			0.5mm			1 mm		0.5 mm	
Spot Size		1100mm at 20m	270mm at 4m	240mm at 3.5m	8mm at 110mm	20mm at 400mm	30mm at 800mm	30mm at 30mm	
Hysteresis								10% max	
Response Time								0.5ms	
Light Source		Red LED		IR LED				Red LED	
Supply Voltage								10 to 30 VDC	
Output Mode								Wire selectable light-on / dark-on	

Learn more at: [www.optex-ramco.com/c2](http://www.optex-ramco.com/c2) - or - [www.optex-ramco.com/c2s](http://www.optex-ramco.com/c2s)

(1) V-61 reflector is included

# ZM Series Photoelectric Sensors

## IP69K Heavy Washdown Resistance



- ✓ Stainless steel IP69K enclosure perfect for food processing lines
- ✓ High pressure, high temperature, detergent washdown resistant
- ✓ BGS type with 8 turn adjustment pot for precise adjustment
- ✓ Long distance 30 meter sensing distance on thrubeam model
- ✓ M12 QD models available - See our website for details

		Thrubeam	Polarized Retroreflective (1)	Diffuse	Background Suppression	
2M Cable	NPN	ZT-M3000N	ZR-M550N	ZD-ZM80CN	BGS-ZM10N	BGS-ZM30N
	PNP	ZT-M3000P	ZR-M550P	ZD-ZM80P	BGS-ZM10P	BGS-ZM30P
M8 4P QD	NPN	ZT-M3000CN	ZR-M550CN	ZD-ZM80CN	BGS-ZM10CN	BGS-ZM30CN
	PNP	ZT-M3000CP	ZR-M550CP	ZD-ZM80CP	BGS-ZM10CP	BGS-ZM30CP
Adjustable Sensing Range		30m	0.01 to 5.5m	800mm	10 to 100mm	10 to 300mm
Repeat Accuracy		1mm			0.5mm	
Spot Size		1200mm at 30m	300mm at 5.5mm	40mm at 800mm	6mm at 80	19mm at 250mm
Hysteresis				20% max	3% max	5% max
Response Time				.5ms		
Light Source				Red LED		
Sensitivity Adjustment			1-turn pot			8-turn pot
Supply Voltage				10 to 30 VDC		
Output Mode				Switch selectable light-on / dark-on		
Mechanical				DIN IP69K 40050-9, IEC IP67 60529, 100G shock		

(1) V-61 reflector is included

Learn more at: [www.optex-ramco.com/zm](http://www.optex-ramco.com/zm)

# V2 DC Series Photoelectric Sensors

## Ideal for Tough Conditions



- ✓ Up to 1 meter background suppression
- ✓ Large projecting and receiving lens ideal for foggy or dusty environments
- ✓ Quick disconnect model features rotating connector providing flexible mounting options

		Thrubeam	Polarized Retroreflective (1)	Background Suppression		
2M Cable	NPN	V2T-7000DN	V2R-1200DN	BGS-2V30N	BGS-2V50N	BGS-2V100N
	PNP	V2T-7000DP	V2R-1200DP	BGS-2V30P	BGS-2V50P	BGS-2V100P
M12 4P QD	NPN	V2T-7000CDN	V2R-1200CDN	BGS-2V30CN	BGS-2V50CN	BGS-2V100CN
	PNP	V2T-7000CDP	V2R-1200CDP	BGS-2V30CP	BGS-2V50CP	BGS-2V100CP
Adjustable Sensing Range		70m	0.01 to 12m	10 to 300mm	150 to 500mm	250 to 1,000mm
Repeat Accuracy			1mm	0.5mm		1mm
Spot Size		1.5m at 50m	440mm at 12m	25mm at 300mm	35mm at 500mm	33mm at 1,000mm
Hysteresis					5% max	
Response Time		1ms	0.7ms		2ms	
Light Source				Red LED		
Sensitivity Adjustment				2-turn pot		
Supply Voltage				10 to 30 VDC		
Output Mode				Light-on / dark-on wiring selectable		
Mechanical				IP67, 50G shock rating		

Use M12-FS4-PVC-2M Cable for QD Type

(1) V-61 reflector is included

Learn more at: [www.optex-ramco.com/v2](http://www.optex-ramco.com/v2)

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## V2 AC/DC Series Photoelectric Sensors

# Multi-Voltage with Relay Output



- ✔ 3 amp form c relay output
- ✔ Up to 1 meter background suppression
- ✔ Large projecting and receiving lens ideal for foggy or dusty environments

		Thrubeam	Polarized Retroreflective (1)	Background Suppression		
2M Cable	Relay Out	V2T-7000	V2R-1200	BGS-2V30	BGS-2V50	BGS-2V100
Adjustable Sensing Range		70m	0.01 to 12m	100 to 300mm	150 to 500mm	250 to 1,000mm
Repeat Accuracy		1mm		0.5mm	1mm	
Spot Size		1.5mm at 20m	400mm at 8m	25mm at 300mm	35mm at 500mm	33mm at 1,000mm
Hysteresis		5% max			20% max.	
Control Output		Relay SPDT, 3 amp at 250VAC / 2 amp at 30VDC				
Response Time		15ms max				
Light Source		Red LED				
Sensitivity Adjustment		2-turn pot				
Supply Voltage		12 to 24 VDC to 24 to 240 VAC +/-10%				
Output Mode		Light-on mode fixed				

(1) V-61 Reflector is included

Learn more at: [www.optex-ramco.com/v2](http://www.optex-ramco.com/v2)

## V AC/DC Series Photoelectric Sensors

# Multi-Voltage with Relay Output Sensors



- ✔ Screw terminal connection for quick maintenance
- ✔ Very high excess gain for use in dusty and dirty environments
- ✔ Multi-voltage sensor with 3 amp form c relay output
- ✔ Up to 70 meter sensing distance (thrubeam)

		Thrubeam	Polarized Retroreflective (1)	Diffuse	
Terminal Base w/ 1/2" Hub	Non Timer	VT-4000	VR-1000	VD-130	VD-300
	With Timer (2)	VT-4000T	VR-1000T	VD-130T	VD-300T
Adjustable Sensing Range		40m	0.1m to 10m	1.3m	3m
Repeat Accuracy		1.5mm	1mm		2mm
Spot Size		1m at 40m	280mm at 10m	38mm at 1.3m	90mm at 3m
Hysteresis		20%			
Output		SPDT Relay - 3A at 30VDC/240VAC			
Output Mode		Light-on fixed			
Response Time		20ms			
Light Source		Red LED			
Sensitivity Adjustment		1-turn pot			
Supply Voltage		24 to 240VAC / 12 to 240VDC +/-10%			
Hook-up Method		Lift-off cover with screw-terminal connection			
Mechanical		IP67, 50G shock rating			

(1) V-61 reflector is included  
(2) Multi-function timer

Learn more at: [www.optex-ramco.com/v](http://www.optex-ramco.com/v)

View Our Full Product Line at:

[www.Optex-Ramco.com](http://www.Optex-Ramco.com)

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**15**

## D3RF Fiber Optic Sensors

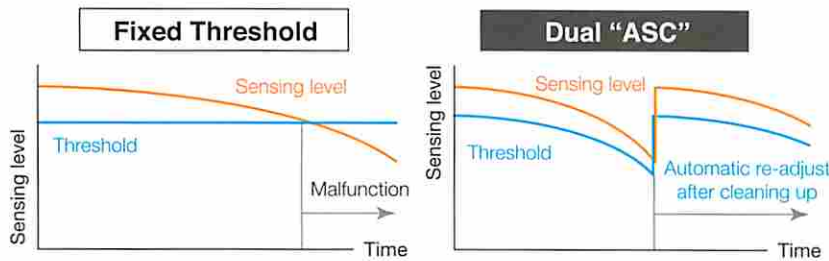
# High Speed Multifunction Digital Fiber Amplifier

- ✔ Powerful LED light source for increased sensing distances
- ✔ As fast as 16 microsecond response time
- ✔ Adjustable hysteresis from 1 - 40% for optimized detection of parts with slight differences or applications with a lot of vibration
- ✔ Simple operation with basic set-up and advanced functions in a deeper set-up layer
- ✔ Remote teach, dual output versions, counter mode with remote reset
- ✔ On board multi-function timer for increased usability

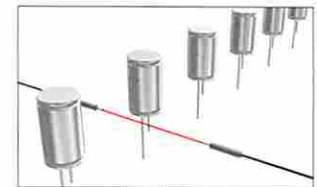


Fibers Sold Separately

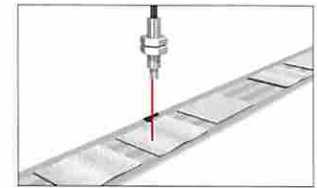
### Dual "ASC" for Easy Maintenance



Detects light degradation due to dust or other debris and adjusts the brightness. It re-adjusts the threshold automatically after cleaning so there's no need for re-teaching.



Adjustable hysteresis allows detection of small part leads



Adjustable hysteresis allows detection of vibrating material

		Single type	Inter-connection type	
			Master	Slave
Cable Type	1 NPN output	D3RF-TN	D3RF-TMN	D3RF-TSN
	1 PNP output	D3RF-TP	D3RF-TMP	D3RF-TSP
M8 4 Pin QD	1 NPN output	D3RF-TCN4	D3RF-TMCN4	D3RF-TSCN4
	1 PNP output	D3RF-TCP4	D3RF-TMCP4	D3RF-TSCP4
Cable Type	2 NPN outputs	D3RF-TDN	D3RF-TDMN	D3RF-TDSN
	2 PNP outputs	D3RF-TDP	D3RF-TDMP	D3RF-TDSP
Light Source		Red LED (632nm)		
LED Power Level Control		3 steps: 100%, 50%, and 25%		
Response Time (Selectable)		16µs, 70µs, 250µs, 1ms, 2ms, 8ms		
Threshold Setting		PB teach and remote input teach (see "Programmable Input")		
Programmable Input		Teach-in, emitter stop, synchronous, counter reset (2 output type only)		
LED Digital Display		4-digit RED for light level, 4-digit GREEN for threshold setting		
Cross-Talk Prevention		Up to 4 each		
Teach Modes		1pt, 2pt, zone, auto, percent, transparent, and 0 percent teach		
Programmable Time Delay		On-delay, off delay, one shot, on/off delay, and off/on delay		

Use M8-FS4-PVC-2M Cable for QD Type  
Analog output option see website for more details

### Communication Module



UC1-CL11 CC Link Module designed for use with the D3RF series fiber amplifiers

Learn more at: [www.optex-ramco.com/d3rf](http://www.optex-ramco.com/d3rf)

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To order or for support:  
**1-800-280-6933**



## BRF Series Fiber Optic Sensors

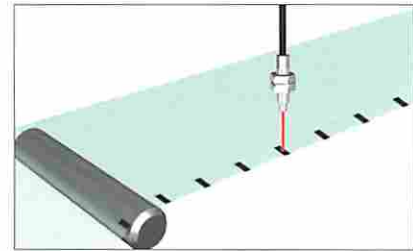
# 32 Models - One to Fit Your Needs

- ✔ 10 turn adjustment pot for fine tuning
- ✔ IP66 model does need to be mounted in cabinet
- ✔ Ideal for basic on/off cost sensitive applications that require fiber optics for flexible mounting
- ✔ Available in red and green LED for mark sensing applications
- ✔ 40ms off delay pulse stretcher built in



Connection Type	Output Type	Standard	High Speed	Mark Sensing
		Red LED		Green LED
Cable type	NPN	BRF-N	BRF-HN	BGF-N
	PNP	BRF-P	BRF-HP	BGF-P
M8 4pin QD	NPN	BRF-CN	BRF-CHN	BGF-CN
	PNP	BRF-CP	BRF-CHP	BGF-CP
Response Time		250µs	50µs	250µs
Light Source		Red LED		Green LED
Sensitivity Control		10-turn potentiometer		
Timer Option		Selectable off-delay 40ms		
Enclosure Rating		IP66 (with cover closed)		

Use M8-FS4-PVC-2M Cable for QD Type



High speed registration mark detection

Learn more at: [www.optex-ramco.com/brf](http://www.optex-ramco.com/brf)

## D3IF and BIF Series Fiber Optic Sensors

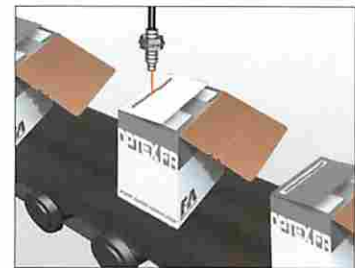
# Moisture Detection Amplifiers

- ✔ Designed for detection of H<sub>2</sub> molecules
- ✔ Perfect for detection of water based glue, saturation levels, & liquid level detection
- ✔ Digital display and turn pot adjust type available
- ✔ For use with NF-DW01 (diffuse) and NF-TW01 (thru-beam) fiber cables



Connection	Output	Liquid Sensing Type	
		D3IF-TN	BIF-WN
2m Cable	NPN	D3IF-TN	BIF-WN
	PNP	D3IF-TP	BIF-WP
M8 4 Pin QD	NPN	D3IF-TN	BIF-CWN
	PNP	D3IF-TP	BIF-CWP
Light Source		IR (1450nm)	
Threshold Setting		Push button	10-Turn potentiometer
Display		Digital display	Orange LED (output) Green LED (stability)
Response Time-Digital		16µs, 70µs, 250µs, 500µs, 1ms, 2ms, and 8ms	1ms
Control Outputs		1 each digital	

Use M8-FS4-PVC-2M Cable for QD Type



Detection of water based glue on cartons

View Our Full Product Line at:

[www.Optex-Ramco.com](http://www.Optex-Ramco.com)

**THINK OPTEX FOR**  
FIBER OPTIC AMPLIFIERS / CABLES

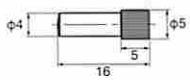
**17**

# Fibers Diffuse

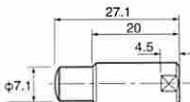
Part Number	Picture	Cable Bend Radius	D3RF Series (mm)	BRF Series (mm)
NF-DB01 Free cut, Coaxial		R25	1200	150
NF-DJ02 1M Free cut, 300mm SS sheath		R10	440	100
NF-DR06 Free cut, Coaxial, Lens mountable		R4		35
NF-DM01 Free cut		R25	1100	160
NF-DM02 Free cut, Coaxial, Lens mountable		R15	500	70
NF-DM02-G4 Free cut, Coaxial, Lens mountable		R25	500	70
FD-TT2 Free Cut		R15	300	35
NF-DJ01 1M Free cut, Coaxial, 300mm SS sheath		R10	180	50
NF-DK21 500mm fixed length, Coaxial, Lens mountable		R15	180	20
NF-DR02 Free cut		R4	300	20
NF-DR08 Free cut		R4	88	20
NF-DS06 Free cut		R15	400	45
NF-DT01 Free cut, Coaxial, Lens mountable		R15	500	70
NF-DB10 Free cut, Head length: 15mm		R25	690	150
NF-DK04 Free cut, Head length: 17mm		R25	1200	160
NF-DK04Z Free cut, Head length: 17mm		R2	850	110
NF-DR11 Free cut, Coaxial, Head length: 15mm		R2	270	55
NF-DT03 Free cut, Head length: 10mm		R15	400	45
NF-DR04 1M fixed length, Head length: 15mm		R4	300	20
NF-DB02 Free cut, Coaxial, Sleeve length: 90mm		R25	1100	150

Part Number	Picture	Cable Bend Radius	D3RF Series (mm)	BRF Series (mm)
NF-DV03 Free cut, Sleeve length: 20mm		R25	680	90
NF-DR10 Free cut, Sleeve length: 40mm		R1	140	10
NF-DT05 Free cut, Sleeve length: 28mm		R15	450	45
NF-DT04 500mm fixed length, Sleeve length: 15mm		R4	240	15
NF-DK33 Free cut, Sleeve length: 65mm		R25	230	15
NF-DV01 Free cut, Sleeve length: 65mm		R25	680	90
NF-DK43 Free cut, Sleeve length: 20mm		R15	400	45
NF-DR05 500mm fixed length, Head length: 15mm, Sleeve length: 5mm		R4	190	10
NF-DR07 Sleeve length: 80mm		R25	90	7
NF-DV02 Free cut, Sleeve length: 10mm		R15	680	90
NF-DB09 Free cut		R25	540	100
NF25-D Free cut, Material: Nylon, Mtg nut is incl.		R25	550	45
NF-DH01 Free cut, 200° C		R35	2400	300
NF-DH09 Free cut, 130° C		R25	720	200
NF-DH83 1M fixed length, Stainless steel sheath, 300° C		R25		140
NF-DH07 2M fixed length, Coaxial, Metal sheath, 200° C		R25	100	16
NF-DH03 2M fixed length, Coaxial, Metal sheath, 350° C		R25	940	150
NF-DH04 2M fixed length, Metal Sheath, Sleeve length: 60mm, 350° C		R25	950	300
NF-DH05 1M fixed length, Metal sheath, Sleeve length: 90mm, 350° C		R25	1100	200

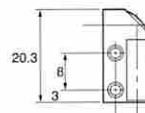
## Focusing and Zoom Lens Options



**NF-DA03**  $\phi$ 0.2mm @ NF-DK21  
 $\phi$ 0.4mm @ NF-DT01  
( $\phi$ 0.005mm gold-coated wire)

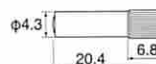


**NF-DA06**  $\phi$ 0.7mm - 0.85mm @ NF-DM02  
( $\phi$ 0.2mm gold-coated wire)



**NF-DA07**

$\phi$ 0.5mm - 0.8mm @ NF-DM02  
( $\phi$ 0.1mm gold-coated wire)



**NF-DA01**

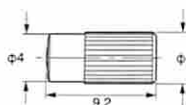
$\phi$ 0.2mm @ NF-DK21  
( $\phi$ 0.005 gold-coated wire)  
 $\phi$ 0.4mm @ NF-DT01  
( $\phi$ 0.01mm gold-coated wire)

# Thrubeam Fibers

Part Number	Picture	Cable Bend Radius	D3RF Series (mm)	BRF Series (mm)
NF-TB01 Free cut, Lens mountable		R30	4000	700
NF-TB01-10 Free cut, Lens mountable, 10M cable		R30	4000	700
NF-TB02 Free cut, Lens mountable		R25	4000	450
NF-TJ01 Coaxial, Lens mountable, Stainless steel sheath		R10	1590	300
NF-TR01 Free cut, Lens mountable		R4	4000	330
NF25-T Free cut, Material: Nylon, Mtg nut is incl.		R25	2500	350
NF-TB06 Free cut, Lens mountable		R25	1440	350
NF-TR08 Free cut		R1	1530	300
NF-TB03 Free cut, Sleeve length: 90mm		R25	1200	160
NF-TM01 Free cut		R25	3500	450
NF-TR02 Free cut		R4	850	110
NF-TB05 Free cut, Sleeve length: 40mm		R25	270	55
NF-TV04 Free cut, Sleeve length: 10mm		R15	650	75
NF-TK05 Free cut, Head length: 14mm		R2	4000	360
NF-TR10 Free cut, Head length: 8mm, Lens attached		R1	3600	550
NF-TS07 Free cut		R30	4000	700
NF-TB07 Free cut, Head length: 8mm		R25	1710	350
NF-TR04 500mm fixed length, Head length: 6mm		R4	54	10
NF-TM03 Free cut, Head length: 10mm		R15	900	120

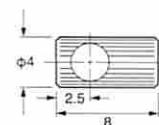
Part Number	Picture	Cable Bend Radius	D3RF Series (mm)	BRF Series (mm)
NF-TS22V Free cut, Head length: 30mm		R1	3500	700
NF-TV08 Free cut, Head length: 25mm		R25	3600	1000
NF-TS08 Free cut, Sleeve length: 30mm		R25	2500	180
NF-TP01 500mm fixed length, Head length: 10mm, Sleeve length: 5mm		R5	27	1
NF-TT01 Free cut, Head length: 15mm, Sleeve length: 5mm		R15	170	30
NF-TV01 Free cut, Sleeve length: 20mm		R25	2000	320
NF-TV01-5 5 meter free cut, Sleeve length: 20mm		R25	1700	200
NF-TG05 Free cut, Head length: 15mm		R1	160	20
NF-TV02 Free cut, Sleeve length: 10mm		R15	650	75
NF-TH01 Free cut, Lens mountable, 100° C		R25	2400	300
NF-TH02 Free cut, 200° C		R35	4000	600
NF-TH08 2M fixed length, Lens mountable, 300° C		R25	1440	300
NF-TH10 1M fixed length, Lens mountable, 200° C		R10	570	110
NF-TH11 1M fixed length, Lens mountable, 200° C		R25	1350	280
NF-TH17 Free cut, 130° C		R25	2100	500
NF-TS22M Free cut, Head length: 30mm, 105° C		R10	3500	500
NF-TH07 2M fixed length, Sleeve length 8mm, 200° C		R50	300	50
NF-TH05S-A		R30	1600	150
NF-TH04S-27V2 200mm fixed length, Sleeve length 27mm, 200° C		R30	450	50

## Extension Lenses for Thrubeam Fibers



NF-TA03

Straight extends sensing distance to as much as 4 meters temp range -40 to 350 degree Celsius

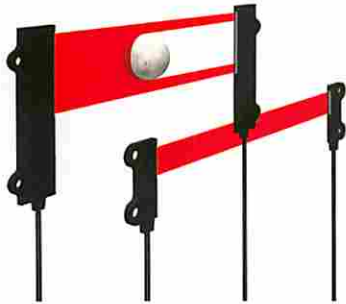


NF-TA05

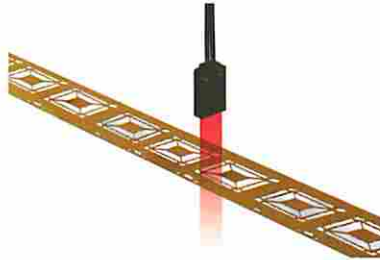
Side view extends sensing distance to as much as 4 meters temp range -40 to 350 degree Celsius

# Special Purpose Fibers

Check Out Our Full Fiber Solutions Online at: [www.Optex-Ramco.com/fibers](http://www.Optex-Ramco.com/fibers)



**NF-TS40** - 40mm array  
**NF-TZ01 & NF-TZ02** - 32mm array  
**NF-TZ03 & NF-TZ04** - 11mm array

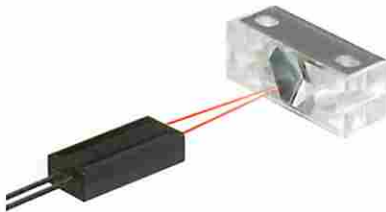


**NF-DZ01** Diffuse 2 X 15mm Beam

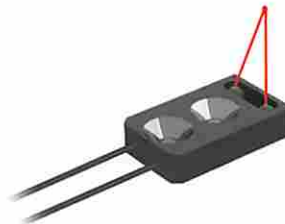


**Thrubeam**  
**NF-TZ05** Top  
**NF-TZ06** Side

**Diffuse**  
**NF-DZ02** Top  
**NF-DZ03** Side



**Retroreflective for Transparent Detection**  
**NF-RR01** - Top sense



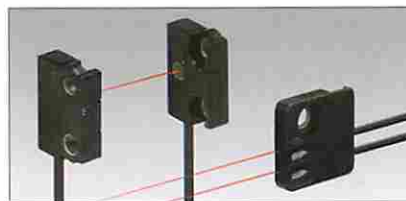
**Convergent & Limited Distance**  
 Many options to choose from  
 See our website for details



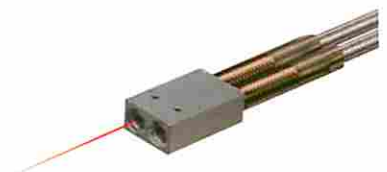
**Liquid Level & Leak Sensors**  
 Many options to choose from  
 See our website for details



**Wafer Mapping / Narrow Beam**  
**NF-TG03** - Right Angle  
**NF-TG01** - Straight  
**NF-RG01** - Retroreflective  
**NF-DR09** - Diffuse



**Top, Side, and Front Sensing for Easy Mounting**  
 All in one versions for adjusting from top to side easily.



**Vacuum Resistant Fibers**  
**NF-DN01** - Diffuse  
**NF-TN01** - Thrubeam  
**NF-DN02** - Convergent

## DM-18T RGB Color Sensor Series

# Automatic RGB Color Sensing

- ✔ Color and mark detection mode increases usability
- ✔ Push button teach with digital display and fine tune adjustment
- ✔ Ability to store up to 8 sensing parameters and select them remotely

		Selectable Color / Mark Sensor
2M Cable - Six conductor	NPN	DM-18TN
	PNP	DM-18TP
M8 4P QD	NPN	DM-18TCN
	PNP	DM-18TCP
Adjustable Sensing Range		18mm +/- 2mm
Light Source		Red, green, blue LED
Spot Size		1 x 6 mm at 18mm
Mark Mode Response Time		Selectable: 250µs / 500µs / 1250µs
Color Mode Response Time		Selectable: 800µs / 1600µs / 4000µs
Memory Storage Banks - Input Wire Selectable		2m cable version: 1 to 8 / M8 version: 2 each
Selectable Timer		On-delay, off-delay, one-shot
Supply Voltage		10 to 30 VDC

Use M8-FS4-PVC-2M Cable for QD Type

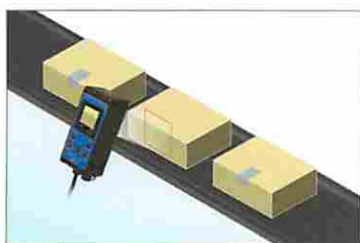


Learn more at: [www.optex-ramco.com/dm18t](http://www.optex-ramco.com/dm18t)

## CVS1 Easy Series Color Area Sensor

# All-In-One Color Sensor

- ✔ Ability to detect color & amount of color within its field of view
- ✔ Intuitive user interface makes set-up quick and easy
- ✔ Ideal for applications where sensing distance or parts are not repeatable
- ✔ Less expensive and complicated than a color vision system



Learn more at:  
[www.optex-ramco.com/cvs1](http://www.optex-ramco.com/cvs1)

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**THINK OPTEX FOR  
COLOR SENSORS**

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# OPPF and OPPD LED Lighting Controllers

## LED Vision Lighting

- ✔ OPPD-15 extremely compact controller
- ✔ 1,000 step adjustable display
- ✔ Stable brightness with synchronizing control input and pulse width modulation
- ✔ OPPF Series incorporates feedback loop between light and controller that enables accurate monitoring and feedback brightness control

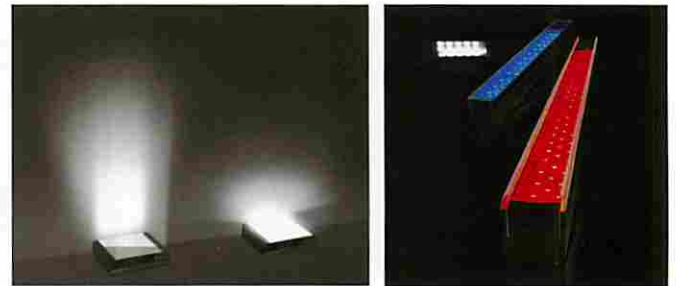


Learn more at: [www.optex-ramco.com/oppf](http://www.optex-ramco.com/oppf) -or- [www.optex-ramco.com/oppd](http://www.optex-ramco.com/oppd)

# OPB-S, OPF, and OPR Series LED Lighting

## LED Vision Lighting

- ✔ Lighting incorporates sensors for monitoring of temperature and brightness
- ✔ OPF series provides high precision edge extraction and foreign object detection
- ✔ Convergent & diffuse type lighting for selecting light directivity angle based on the application
- ✔ Convergent models incorporates a prism sheet which enables clear edge extraction of transparent work pieces
- ✔ Controllers available with unique "Falux" technology that have built in photo diodes that monitor brightness level of light and automatically adjust brightness in order to maintain consistent light level



Example of OPF series High precision edge extraction



OPR-S85-58W 85mm diameter



OPR-32-10W 32mm Diameter

Learn more at: [www.optex-ramco.com/opr](http://www.optex-ramco.com/opr) -or- [www.optex-ramco.com/opf](http://www.optex-ramco.com/opf)

# Cord Sets / Accessories

## Molded Cord Sets with Thread Type Female Connector



M8, 4 Pin Female Threaded Connector



M12, 4 Pin Female Threaded Connector

	Straight	90° Angle
M8 3 Pin 3 Wire	M8-FS3-PVC-2M	M8-FA3-PVC-2M
	M8-FS3-PVC-5M	M8-FA3-PVC-5M
	M8-FS3-PVC-10M	
M8 4 Pin 4 Wire	M8-FS4-PVC-2M	M8-FA4-PVC-2M
	M8-FS4-PVC-3M	
	M8-FS4-PVC-5M	M8-FA4-PVC-5M
	M8-FS4-PVC-10M	M8-FA4-PVC-10M
M12 4 Pin 4 Wire	M12-FS4-PVC-2M	M12-FA4-PVC-2M
	M12-FS4-PVC-3M	
	M12-FS4-PVC-5M	M12-FA4-PVC-5M
	M12-FS4-PVC-10M	M12-FA4-PVC-10M
	M12-FS4-PVC-15M	M12-FA4-PVC-15M
M12 5 Pin 5 Wire	M12-FS5-PVC-2M-BLK	
	M12-FS5-PVC-3M-BLK	
	M12-FS5-PVC-5M-BLK	
M12 8 Pin 8 Wire	M12-FS8-PVC-2M-BLK	
	M12-FS8-PVC-5M-BLK	



Double Ended Extension Cord Set with Straight - Thread Type Female and Male Connectors

M8 4 Pin 4 Wire	M8-FS4-MS4-PVC-2M	M8-FS4-MS4-PVC-5M
M12 4 Pin 4 Wire	M12-FS4-MS4-PVC-2M	M12-FS4-MS4-PVC-5M
	M12-FS4-MS4-PVC-10M	
	M12-FS5-MS5-2M-BLK	M12-FS5-MS5-3M-BLK
M12 5 Pin 5 Wire	M12-FS5-MS5-3M-BLK	
	M12-FS8-MS8-PVC-3M-BLK	M12-FS8-MS8-PVC-5M-BLK



Field Wireable Connectors / Receptacles

	Female Straight *	Male Straight *	Female Recept
M8 3P/3W	PL-V83A	PLM-V83A	M8-F3P-R
M8 4P/4W	PL-V84A	PLM-V84A	M8-F4P-R
M12 4P/4W	PL-V14P	PLM-V14P	M12-F4P-R
M12 5P/5W	PL-V15AP	PLM-V15AP	M12-F5P-R
M12 8P/8W			M12-F8P-R

\* Also available in 90° angle type



M8 4P/4W Female to M12 4P/4W

M8 Female to M12 Male	M8-FS4-M12-MS4-PVC-152 (6")	M8-FS4-M12-MS4-PVC-2M
-----------------------	-----------------------------	-----------------------

M8 4P/4W Female to M8 3P/3W

M8 Female to M8 Male	M8-FS4-MS3-PVC-152 (6")
----------------------	-------------------------



### Power Supply / Sensor Controller

Converts the signal from any NPN output device to operate a SPDT relay

	PS930/110
Supply Voltage	110VAC
DC Output Voltage	12VDC @75mA
Relay Contact Rating	3 amps
Mounting	DIN rail mount 8-pin octal base is included



### DIN Rail Mount Converter Modules

Requires 10-30VDC power

RCM	NPN to PNP w/ 5VDC output
RCM-1	NPN to PNP
RCM-2	NPN to PNP w/ 12VDC output
RCM-3	PNP to NPN
RCM-1X3	(3) NPN to (3) PNP
RCM-1X3P	(3) PNP to (3) NPN



### DIN Rail Mount 'And' / 'OR' Logic Module

	MC97
Supply Voltage	12 to 30 VDC
Input Signal	Up to 6 each PNP (sourcing)
Logic Operation	Selectable: 'AND' or 'OR'
Controller Output	NPN or PNP
Output Mode	Selectable: N.O. or N.C.

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**THINK OPEX FOR**  
CORD SETS / ACCESSORIES

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