FIBER SENSORS

SPECIFICATIONS

LASER SENSORS	\mathbb{N}			Connector type			Cable type		
PHOTO- ELECTRIC SENSORS			Туре	Top sensing	Front sensing	L type (Top sensing)	Top sensing	Front sensing	L type (Top sensing)
		<u>Ś</u>	Light-ON	PM2-LH10	PM2-LF10	PM2-LL10	PM2-LH10-C1	PM2-LF10-C1	PM2-LL10-C1
MICRO PHOTO- ELECTRIC SENSORS	Item		Dark-ON	PM2-LH10B	PM2-LF10B	PM2-LL10B	PM2-LH10B-C1	PM2-LF10B-C1	PM2-LL10B-C1
AREA SENSORS	Sensing range			2.5 to 8 mm 0.098 to 0.315 in (Conv. point: 5 mm 0.197 in) with white non-glossy paper (15 × 15 mm 0.591 × 0.591 in) (Note 2)					
LIGHT	Min. sensing object			Ø0.05 mm Ø0.002 in copper wire (Setting distance: 5 mm 0.197 in)					
CURTAINS / SAFETY	Hysteresis			20 % or less of operation distance with white non-glossy paper (15 × 15 mm 0.591 × 0.591 in)					
COMPONENTS PRESSURE / FLOW	Repeatability (perpendicular to sensing axis)			0.08 mm 0.003 in or less (Note 3)					
FLOW SENSORS	Supply voltage			5 to 24 V DC ±10 % Ripple P-P 5 % or less					
INDUCTIVE PROXIMITY	Current consumption			Average: 25 mA or less, Peak: 80 mA or less					
SENSORS	Output			NPN open-collector transistor • Maximum sink current: 100 mA • Applied voltage: 30 V DC or less (between output and 0 V)					
PARTICULAR USE SENSORS									
				 Residual voltage: 1 V or less (at 100 mA sink current) 					
SENSOR OPTIONS			0.4 V or less (at 16 mA sink current)						
SIMPLE WIRE-SAVING UNITS		Utilization category		DC-12 or DC-13					
	Overcurrent protection		Incorporated						
WIRE-SAVING SYSTEMS	Response time			0.8 ms or less					
MEASURE-	Operation indicator		Red LED (lights up when the output is ON)						
MEASORE- MENT SENSORS	ance		egree	3 (Industrial environment)					
STATIC ELECTRICITY PREVENTION DEVICES	esist		•	-10 to +55 °C +14 to +131 °F (No dew condensation or icing allowed), Storage: -25 to +80 °C -13 to +176 °F 45 to 85 % RH, Storage: 45 to 85 % RH					
	tal re	Ambient humidity Ambient illuminance		Incandescent light: 3,500 {x at the light-receiving face					
LASER MARKERS			EN 60947-5						
WARKERS	Pollution degree Ambient temperature Ambient humidity Ambient illuminance EMC Vibration resistance Shock resistance		10 to 55 Hz frequency, 1.5 mm 0.059 in amplitude in X, Y and Z directions for two hours each						
PLC	Envi	Shock resistance		500 m/s ² acceleration (50 G approx.) in X, Y and Z directions for three times each					
HUMAN	Emitting element		Infrared LED (Peak emission wavelength: 880 nm 0.035 mil, modulated)						
MACHINE	Material			Enclosure: Polycarbonate, Terminal part: Copper alloy (Ag plated)			Enclosure: Polycarbonate, Fixed cable part: PBT		
ENERGY CONSUMPTION VISUALIZATION	Cable						0.2 mm ² 3-core cabtyre cable, 1 m 3.281 ft long (Note 4)		
COMPONENTS				Total length up to 2 m 6.562 ft is possible with 0.3 mm ² , or more, cable.					
FA COMPONENTS	COMPONENTS Wiring leng			(If the cable is extended for 2 m 6.562 ft, or more, a capacitor of 10 μ F must be connected between +V and 0 V terminals.)					
MACHINE									
MACHINE VISION SYSTEMS	Weight			Net weight: 4.5 g		Net weight: 4 g approx.			
UV CURING					Gross weight: 85 g approx. (10 piece package) (10 piece package) Gross weight: 330 g approx (10 piece package) (10 piece package)				
CURING SYSTEMS	Note	: 1) Where	measurement c	onditions have not been specified precisely, the conditions used were an ambient temperature of +23 °C +73.4 °F.					

Notes: 1) Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of +23 °C +73.4 °F. 2) The sensing range may extend up to 12.5 mm 0.492 in with white non-glossy paper due to product variation.

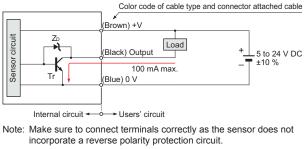
3) The repeatability is specified for white non-glossy paper (15 × 15 mm 0.591 × 0.591 in) at a setting distance of 5 mm 0.197 in.

4) Cable cannot be extended.

PM2

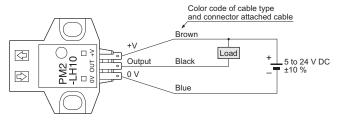
I/O CIRCUIT AND WIRING DIAGRAMS





Symbols ... ZD: Surge absorption zener diode Tr: NPN output transistor

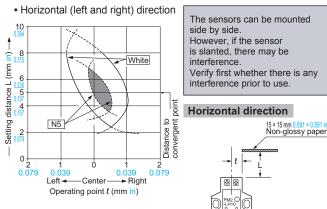
Wiring diagram



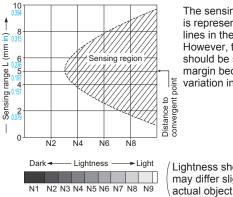
FIBER SENSORS

SENSING CHARACTERISTICS (TYPICAL)

Sensing fields

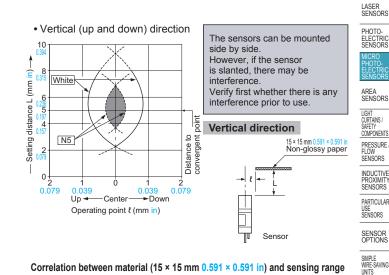


Correlation between lightness and sensing range

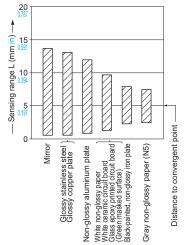


The sensing region (typical) is represented by oblique lines in the left figure. However, the sensitivity should be set with enough margin because of slight variation in products.

Lightness shown on the left may differ slightly from the actual object condition.



Correlation between material (15 × 15 mm 0.591 × 0.591 in) and sensing range



The bars in the graph indicate the sensing range (typical) for the respective material. However, there is a slight variation in the sensing range depending on the product. Further, if there is a reflective object (conveyer, etc.) in the background of the sensing object, since it affects the sensing, separate it by more than twice the sensing range shown in the left graph.

Refer to p.1458~ for general precautions.

FA COMPONENTS MACHINE VISION SYSTEMS

WIRE-SAVING SYSTEMS

MEASURE-

MENT SENSORS

STATIC ELECTRICITY PREVENTION

LASER MARKERS

DEVICES

PLC

HUMAN

ENERG

MACHINE INTERFACES

CONSUMPTIO VISUALIZATIO COMPONENTS

UV CURING SYSTEMS

Selection Guide U-shaped

PM₂

PRECAUTIONS FOR PROPER USE

All models

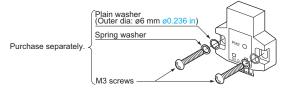
· Never use this product as a sensing device for personnel protection.



In case of using sensing devices for personnel protection, use products which meet laws and standards, such as OSHA, ANSI or IEC etc., for personnel protection applicable in each region or country.

Mounting

· When fixing the sensor with screws, use M3 screws and the tightening torque should be 0.49 N m or less. Further, use small, round type plain washers (ø6 mm ø0.236 in).



Others

- · Do not use during the initial transient time (50 ms) after the power supply is switched on.
- Take care that the product does not come in direct contact with oil, grease, or organic solvents, such as, thinner, etc.

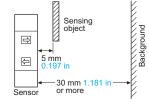
Wiring

- Make sure to connect terminals correctly as the sensor does not incorporate a reverse polarity protection circuit.
- · If the sensor is being used in a noisy environment, examine the extent of noise. Further, if equipment, such as motor, solenoid or electromagnetic valve, which generates a large surge, is present near the sensor, connect a surge absorber to the equipment.

Setting

· The optimum setting distance (distance to convergent point) is 5 mm 0.197 in. The sensor is not affected

even by a specular background if it is located 30 mm 1.181 in, or more, away from the sensor.



However, the specular background should be a plane surface, directly facing the sensor. A spherical or curved background may be detected.