通用光电传感器 使用说明书

PB 系列

非常感谢您购买韩荣乐嗣电子（上海）有限公司的产品。
请确认产品是否相符，并按照以下事项使用。

请将说明书放在随时便于查阅的位置上。

HANYOUNG NUX

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MK2101KE180430

安全注意事项

使用前请仔细阅读安全有关注意事项，适当的安装使用。
说明书记载的注意事项按重要度区分为危险、警告、注意标志。

⚠ 危 险	若不遵守则会有死亡或重伤等紧急的危险状况。
⚠ 警 告	若不遵守可能发生死亡或重伤的内容。
⚠ 注 意	若不遵守可能会发生轻微伤害或有财产损失的内容。

⚠ 危 险

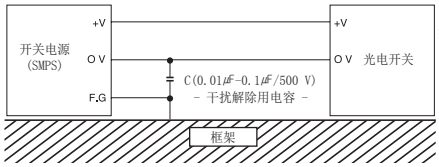
- 输入，输出端子有触电危险，切勿与身体及通电物接触。

⚠ 警 告

- 请勿使用在室外。（会影响到产品寿命及存在触电的危险。）
- 切勿在易燃性，爆发性气体环境下使用。（本机属非防爆构造，存在火灾及爆发的危险）
- 请勿在超过规格震动及冲击的场所使用。（虽两层绝缘构造，零部件会受损失。）

⚠ 注 意

- 产品的镜片或外壳的清洁，只用干布轻擦即可，切勿使用稀释剂或酒精等有机溶剂。
- 请隔开高压线 动力线和传感器的配线，并分别进行配线以防止干扰引起的误动作。
- 延长电缆时，请尽量使用0.3 ㎟以上的粗线。此时，请注意电压下降。
- 白炽灯或水银灯等高频成分照明下使用传感器时，请按装遮光板，且切勿镜面对照明正面方向。
- 使用对射型2套以上时，可能因相互干扰而引起误动作，请留充分的间隔，投光部和受光部互相交叉安装。
- 在输出端使用诱导性负载（继电器，漆包线）时，因一瞬间负载会增加两倍，而会损害输出端的三极管，请使用最大负载的1/2设定。
- 输出端内置过电流保护回路，因超过额定负载电流会输出断路，所以请在最大负载的70 %以内设定使用。
- 切勿在灰尘及异物严重的场所使用，容易导致镜面污染引起误动作，
- 使用说明书的内容有可能在没有事前通知或预告下变更。
- 不按制造商指定的方法使用时，有可能会受伤或造成财产损失。
- 电源为开关电源使用时，FG端子进行接地，0V和FG端子之间必须和干扰解除用的电容接线。



※ 为了安全，防止产品故障，请遵守上述注意事项。

型号构成

型 号	代 码						内 容	
PB-	□	□	□	□			通用光电传感器	
检测方式及检测距离	T	7			7 m		对射型	
		10			10 m			
		15			15 m			
	M	3			3 m		镜面反射型	
	P	3			3 m		偏光镜面反射型	
	R	01			0.1 m		漫反射型	
		04			0.4 m			
		1			1 m			
	D	04			0.4 m		限定距离型	
光 源							红外线 (IR)	
				R			红色光 (RED)	
输 出					N		NPN 集电极开路输出	
					P		PNP 集电极开路输出	

规 格

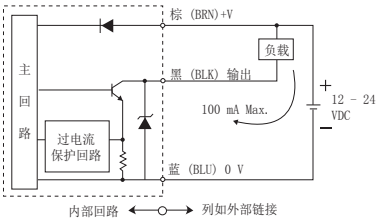
型号	NPN	T7N	T10RN	T15N	M3RN	P3RN	R01N	R04RN	R1N	D04N
	PNP	T7P	T10RP	T15P	M3RP	P3RP	R01P	R04RP	R1P	D04P
检测方式		对射型			镜面反射型	偏光镜面反射型	漫反射型			限定距离型
检测距离		7 m	10 m	15 m	0.1～3 m (注1)		0.1 m	0.4 m	1 m	0.4 m
标准检测物体		Ø12 mm 以上 非透明体			Ø75 mm 以上 非透明体		100 x 100 mm 无光白纸			
滞后距离		-					检测距离的 20 % 以下			
电源电压		12 - 24 VDC ±10 %, 纹波(p-p) 10 % 以下								
消耗电流		投光 : 15 mA, 受光 : 20 mA 以下					30 mA 以下			
控制输出		•NPN/PNP集电极开路输出 •负载电流 - 100 mA 以下 (26.4 V d.c. 基准) •残留电压 - NPN : 1 V 以下, PNP : 1 V 以下								
动作模式		通过电位器可切换入光/遮光 (Light ON/Dark ON) 模式（限于对射型的受光部，反射型）								
应答时间		1 ms 以下								
光源 (波长)		IR	RED	IR	RED		IR	RED	IR	IR
指示灯		•红色 LED : 控制输出 •绿色 LED : 稳定区域（注，对射型投光部红色LED为电源显示）								
保护回路		•电源逆接保护 •输出逆接保护 •输出短路保护•相互干涉防止功能（除对射型以外）•输出短路提示功能［（除投光部外）(注2)］								
环境照度		太阳光 : 11,000 Lux 以下, 白炽灯 : 3,000 Lux 以下								
环境温度		动作时 : -20 ~ 60 ℃, 保管时 : -25 ~ 70 ℃ (但, 不可有结冰・结露)								
环境湿度		35 ~ 85 % RH (但, 不可有结冰・结露)								
保护等级		IP 65 (IEC)								
绝缘电阻		20 MΩ 以上 (500 V d.c. 兆基准)								
耐干扰		根据干扰模拟装置方形波干扰 (脉冲幅 1㎲) ± 240 V								
耐电压		1,000 VAC (50/60 Hz 1分钟)								
耐振动		10 - 55 Hz, 复振幅 : 1.5 mm, X・Y・Z 各方向2小时								
耐冲击		500 ㎨, X・Y・Z 各方向3次								
认证规格		CE								
连接方式		电缆引出式								
电缆规格		Ø3.8 mm, 3P, 2 m, 黑色 (注, 投光部 Ø3.8 mm, 2P, 2 m, 灰色)								
材质		透镜 : PC, 外壳 : PBT, 固定架 : SCP1								
重量		约 95g			约 60g		约 50g			约 50g

(注1) HY-M5 使用时 3 m, HY-M5S 使用时 4 m
(注2) 入光时 192 ㎲ 当中 红色 LED ON 后, 38.4 ms 当中 红色 LED OFF, 反复

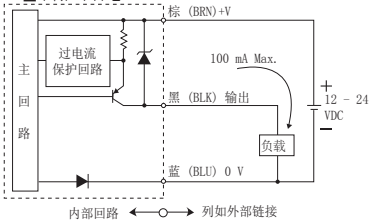
输出回路

※ 限于漫反射型，限定反射型，镜面反射型，对射型的受光部。(注，对射型的投光部只有电源输入(12 - 24 VDC)

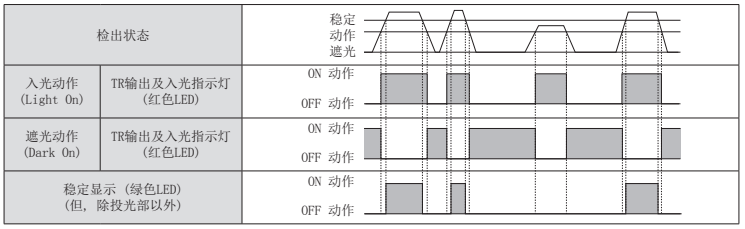
■ NPN TYPE



■ PNP TYPE

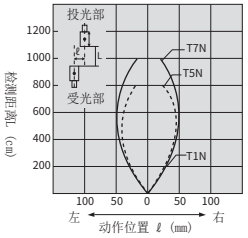


动作图形

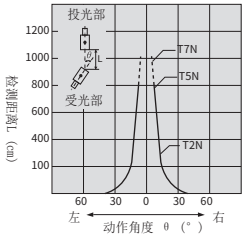


特性表

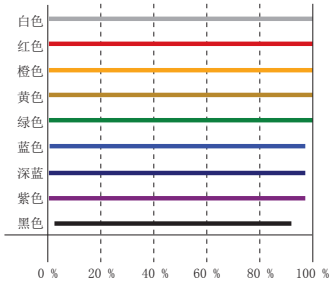
■ 平行移动 (对射型)



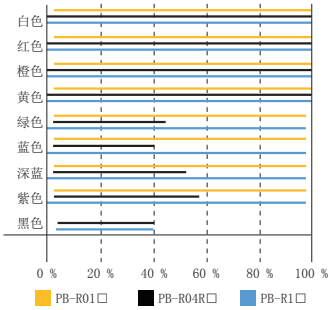
■ 指向角 (对射型)



■ 个别颜色检测距离 (%)
(限定距离型 : 100x100 无光白纸基准)



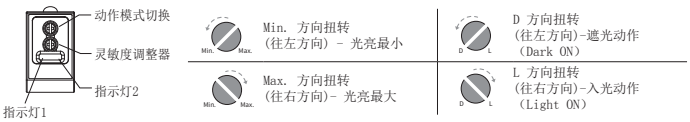
■ 个别颜色检测距离 (%)
(漫反射型 : 100x100 无光白纸基准)

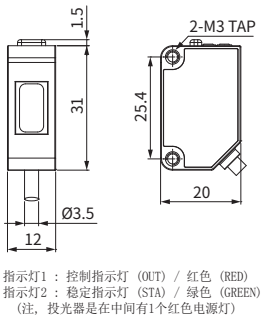


外形尺寸

※ 固定架安装时，使用M3规格螺丝，扭转力为 0.5 N.m 以下。

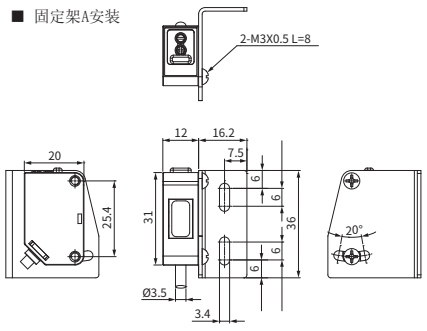
■ 外形图



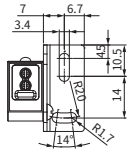


※ 指示灯1 : 控制指示灯 (OUT) / 红色 (RED)
※ 指示灯2 : 稳定指示灯 (STA) / 绿色 (GREEN)
(注, 投光器是在中间有1个红色电源灯)

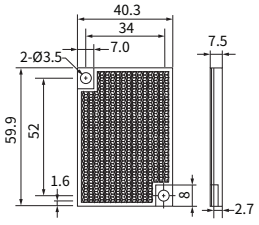
■ 固定架A安装

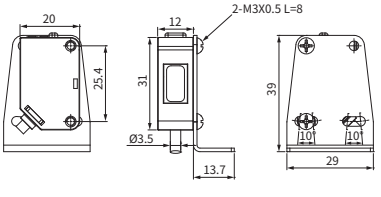


■ 固定架B安装



■ 反射板 (HY-M5)





General Purpose Photo Sensor

PB series Installation Manual

Thank you for purchasing Hanyoung Nux products. Please read the instruction manual carefully before using this product, and use the product correctly.
Also, please keep this manual where you can view it any time.

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MK2101KE180430

☐Safety information

Please read the safety information carefully before the use, and use the product correctly.
The alerts declared in the manual are classified into Danger, Warning and Caution according to their importance

⚠ DANGER	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury
⚠ WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury
⚠ CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in minor injury or property damage

⚠ DANGER

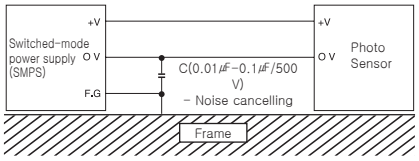
- The input/output terminals are subject to electric shock risk. Never let the input/output terminals come in contact with your body or conductive substances.

⚠ WARNING

- This product is not for outdoor use (it may shorten the product lifetime and cause electric shock)
- Do not use this product in places with flammable or explosive gases (it does not have an explosion-proof structure, so there are fire or explosion risks)
- Do not use the product in places where vibrations or shocks exceed the reference values (it has a double insulation structure, but the components may be damaged)

⚠ CAUTION

- When the lens of the photo sensor is contaminated by foreign substances, use a dry piece of cloth and wipe off the substance lightly. Never use thinner or organic solvents.
- Separate high voltage cable and power line from the sensor wire. Be cautious since using the same pipe during wiring could cause malfunction.
- This product has IP67 protection rating , which means that it is partially waterproof, but it cannot be used in places that are constantly flooded.
- If the cable needs to be extended, use over 0.3 ㎟ and be cautious because of a possible sudden voltage drop.
- When using the sensor under lights with high frequency, such as fluorescent lamps or mercury lamps, block it with a light shading plate and avoid the lens from facing the light directly.
- Malfunction can occur due to mutual interference when using more than 2 pairs of through-beam type photo sensors. Therefore, leave enough space for the mutual separation distance and install the light emitters and the light receivers in alternating positions.
- Using inductive load (relay, coil) for the output can cause an instantaneous increase in load by more than two times and damage the TR of the output. Therefore, please set half of the maximum load.
- There is an over-current protecting circuit within the output side that breaks the output when the current is higher than the rated load current. Therefore, please set within 70% of the maximum load.
- Do not use the product in places with heavy dust or debris that can contaminate the lenses and consequently cause malfunctions.
- The contents of this manual may be changed without prior notification
- Any use of the product other than those specified by the manufacturer may result in personal injury or property damage.
- When using the Switching Power Supply as power source, ground the Frame Ground (F.G.) terminal and be sure to connect the noise-cancelling condenser between 0V and F.G. terminals



※ Be sure to observe the safety precautions mentioned above as cautions to prevent product malfunctions.

☐Suffix code

Model	Code				Content	
PB-	☐	☐	☐	☐	General Purpose Photo Sensor	
Sensing mode and distance	T	7			7 m	Through-beam
		10			10 m	
		15			15 m	
	M	3			3 m	Retro-reflective (mirror)
	P	3			3 m	Retro-reflective (polarized mirror)
	R	01			0.1 m	Diffuse-reflective
		04			0.4 m	
		1			1 m	
	D	04			0.4 m	Distance-settable
Wavelength			R		Infrared (IR)	
					Red light	
Output				N	NPN open collector output	
				P	PNP open collector output	

☐Specification

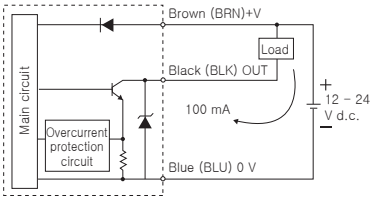
Model	NPN	T7N	T10RN	T15N	M3RN	P3RN	R01N	R04RN	R1N	D04N
	PNP	T7P	T10RP	T15P	M3RP	P3RP	R01P	R04RP	R1P	D04P
Sensing mode		Through-beam			Retro-reflective (mirror)	Retro-reflective (polarized mirror)	Diffuse-reflective			Distance-settable
Sensing distance		7 m	10 m	15 m	0.1 ~ 3 m (note 1)		0.1 m	0.4 m	1 m	0.4 m
Standard detecting object		Opaque object (over Ø12 mm)			Opaque object (over Ø75 mm)		White non-glossy paper (100 x 100 mm)			
Hysteresis		None					Max. 20% of sensing distance			
Power voltage		12 - 24 V d.c. ± 10 % (Ripple max. 10 %)								
Current consumption		Emitter: max. 15 mA, Receiver: max. 20 mA			Max. 30 mA					
Control output		• NPN or PNP open collector output • Load current - max. 100 mA (26.4 V d.c. standard) • Residual voltage - NPN: max. 1 V, PNP: max. 1 V								
Operation mode		Light ON / Dark ON switching selection by VR (only for through-beam type receiver and reflective types)								
Response time		Max. 1 ms								
Wavelength		IR	RED	IR	RED		IR	RED	IR	IR
LED Indicator		• Red LED: control output • Green LED: stability indicator (however, the red LED of the emitter displays the power)								
Protection circuit		• Power reverse protection • Output reverse protection • Output short circuit protection • Mutual interference prevention (except through-beam type) • Output short circuit notification (note 2) (except emitter part)								
Ambient illumination		• Sunlight: max. 11000 lx • Incandescent lamp: max. 3000 lx								
Ambient temperature		• During operation: -20 ~ 60 ℃ • During storage: -25 ~ 70 ℃								
Ambient humidity		35 ~ 85 % RH (without condensation or icing)								
Degree of protection		IP 65 (IEC)								
Insulation resistance		Min. 20 ㏁ (500 V d.c. mega standard)								
Noise immunity		Square wave noise by noise simulator (pulse width 1 ㎲) ±240 V								
Dielectric strength		1,000 V a.c. 50/60 ㎐ for 1 min								
Vibration resistance		10 - 55 ㎐, double amplitude: 1.5 ㎜, X·Y·Z each direction 2 hours								
Shock resistance		500 ㎨, X·Y·Z each direction 3 times								
Approval		CE								
Connection		Cable extended type								
Wiring		Ø3.8 mm, 3-core, 2 m, black (emitter: Ø3.8 mm, 2-core, 2 m, grey)								
Materials		Lens: PC, Case: PBT, Bracket: SCP1								
Weight		Approx. 95g			Approx. 60g		Approx. 50g			Approx. 50g

(Note 1) when using HY-M5: 3 m, when using HY-M5S: 4 m
(Note 2) Repeats red LED OFF for 38.4 ㎳ after red LED turns on for 192 ㎲ during light-on

☐Output circuit

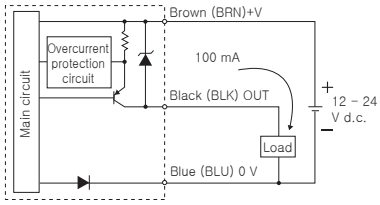
※ Diffuse-reflective, distance-settable, retro-reflective, receiver of through-beam types only (however, the emiiter of through-beam type has 12 - 24 V d.c. power input only.)

■ NPN TYPE



Internal circuit ⟷ External connection example

■ PNP TYPE



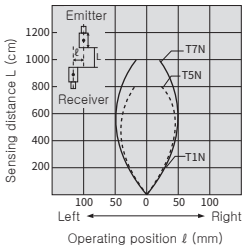
Internal circuit ⟷ External connection example

☐Operation chart

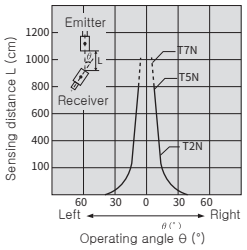
Detection status		
		Stability level Operation level Dark ON
Light On	TR output and indicator light (red LED)	ON operation OFF operation
Dark On	TR output and indicator light (red LED)	ON operation OFF operation
Stability indicator (green LED) (Except for the emitter of the through-beam type)		ON operation OFF operation

☐Characteristic

■ Parallel movement (through-beam type)

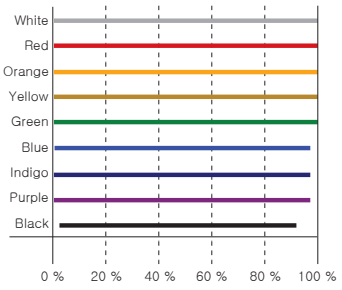


■ Oriented angle (through-beam type)



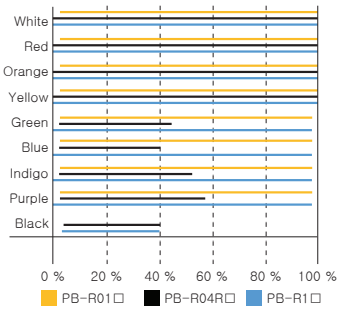
■ Sensing distance by color

(distance-settable: 100x100mm white non-glossy paper)



■ Sensing distance by color

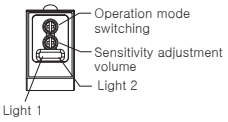
(diffuse-reflective: 100x100mm white non-glossy paper)



☐Dimension

※ When attaching the bracket, use M3 bolts to install the sensor. The tightening torque should be 0.5 N · m or less.

■ Outline drawing



☐Sensitivity setting

Rotate to "Min." (counterclockwise) - Min. light intensity

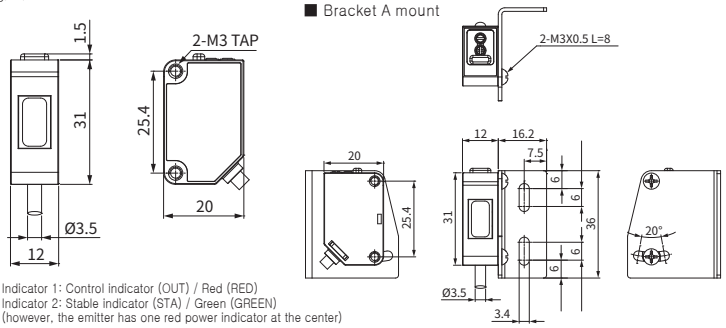
Rotate to "Max." (clockwise) - Max. light intensity

☐Operation mode

Rotate to "D" (counterclockwise) -Dark ON

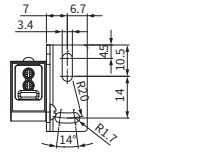
Rotate to "L" (clockwise) -Light ON

■ Bracket A mount



※ Indicator 1: Control indicator (OUT) / Red (RED)
※ Indicator 2: Stable indicator (STA) / Green (GREEN)
(however, the emitter has one red power indicator at the center)

■ Bracket B mount



■ Reflector (HY-M5)