

Panasonic INSTRUCTION MANUAL

Compact-size Picking Area Sensor NA1-PK3 Series

MJEC-NA1PK3TH No.0097-14V

Thank you very much for purchasing Panasonic products. Read this Instruction Manual carefully and thoroughly for the correct and optimum use of this product. Kindly keep this manual in a convenient place for quick reference.

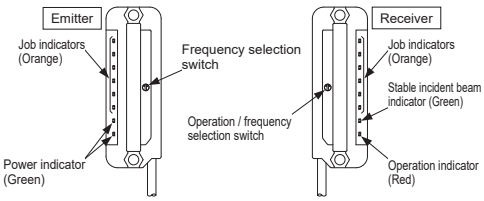
WARNING

- If this product is used as a sensing device for personnel protection, serious body injury or death could result.
- Never use this product as a sensing device with any press machine, shearing machine, roll grinding machine, forming machine, vulcanizer, or robot etc. for protection of a hand or a part of the body.
- This product does not include a self-checking circuit for safety functions necessary to allow its use as a safety device. Thus, a system failure or malfunction can result in either an energized or a de-energized output condition.
- When this product is used as a sensing device in the following applications and if a problem relating to 'law' or 'product liability' occurs, Our company shall not be liable for the failure and for the damage or loss.
 - Use of this product installed to a machinery or a device as a sensing device to detect a hand or a part of the operator's body entering a dangerous area and stop the machinery or the device.
 - Installation of this product to a protection device for preventing to enter a dangerous area and use of this as a sensing device which detects a hand or a part of the operator's body and open / close the door or window.
 - Use of this product as a sensing device for personnel protection (including interlock).
- For sensing devices to be used as safety devices for press machines or for personnel protection, use products which meet standards, such as OSHA, ANSI or IEC etc., for personnel protection applicable in each region or country.
- In case of using as a safety device for press machines in Japan, use a product approved by the Ministry of Health, Labor and Welfare of Japan.

1 REGULATIONS AND STANDARDS

- This product conforms to the regulations and standards below.
 - <Conformity Directives / Conforming Regulations>
 - EU Law : EMC Directives 2014/30/EU
 - British Legislation : EMC Regulations 2016/1091
 - Applicable Standards
 - EN IEC 60947-5-2:2020

2 PART DESCRIPTION



3 MOUNTING

- Use M4 screws with washers and M4 nuts. The tightening torque should be 0.5N·m or less. (Please arrange the screws and the nuts separately.)

4 I/O CIRCUIT DIAGRAMS



5 BEAM ALIGNMENT

- Place the emitter and the receiver face to face along a straight line.
- After the cables have been correctly connected, switch the power ON.
- Move the emitter in the up, down, left and right directions, in order to determine the range of the beam received condition with the help of the operation indicator (red) on the receiver. Then, set the emitter at the center of this range.
- Similarly, adjust for up, down, left and right angular movement of the emitter.
- Further, perform the angular adjustment for the receiver also.
- Check that the stable incident beam indicator (green) lights up.
- Interrupt each beam channel with the actual sensing object, and confirm that the sensor operates correctly.

Note: The stable incident beam indicator (green) lights up when all the three beams are stably received by the receiver.

6 SELECTION OF OUTPUT OPERATION

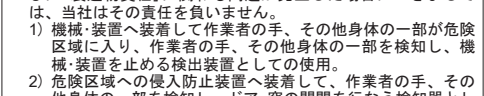
- The output operation can be selected by the operation / frequency selection switch on the receiver. (Make sure to set the switch in the power supply off condition.)

State of operation / frequency selection switch	Output operation
L-ON	OFF when one or more beams are interrupted.
D-ON	ON when one or more beams are interrupted.

Notes: 1) Selection of the output operation and the frequency for the receiver is carried out with the same switch. When the output operation is set, be sure to select the same frequency No. of the emitter and the receiver.
2) In case the operation / frequency selection switch is set to the position other than 1, 2 or 3, the state of the receiver is in D-ON / frequency 1.

7 INTERFERENCE PREVENTION FUNCTION

- By setting different emission frequencies, three sets of the sensors can be mounted closely as shown on the figure right.



However, if the sensors are mounted closely as shown on the figure right, up to 2 sets of sensors are possible.

8 CAUTIONS

- This product has been developed / produced for industrial use only.
- Make sure that the power supply is off while wiring and operation of the selection switch.
- Take care that wrong wiring may damage the sensor.
- Verify that the supply voltage variation is within the rating.
- Do not use during the initial transient time (0.5 sec.) after the power supply is switched on.

9 SPECIFICATIONS

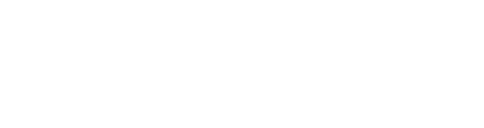
Type	NPN output		PNP output	
	2 m cable length type	5 m cable length type	2 m cable length type	5 m cable length type
Model No. (Note 1)	NA1-PK3	NA1-PK3-C5	NA1-PK3-PN	NA1-PK3-PN-C5
Sensing height	49.2 mm			
Sensing range	30 mm to 300 mm			
Beam pitch	24.6 mm			
Number of beam channels	3 beam channels			
Sensing object	opaque object			
Supply voltage	12 V to 24 V DC±10% Ripple P-P 10% or less			
Current consumption	Emitter: 30mA or less, Receiver: 50mA or less			
Output	NPN open-collector transistor • Maximum sink current: 100 mA • Applied voltage: 30 VDC or less (between output and 0V) • Residual voltage: 1 V or less (at 100mA sink current) 0.4 V or less (at 16 mA sink current)		PNP open-collector transistor • Maximum source current: 100 mA • Applied voltage: 30 VDC or less (between output and +V) • Residual voltage: 1 V or less (at 100 mA source current) 0.4 V or less (at 16 mA source current)	
Short-circuit protection	Incorporated			
Response time	10 ms or less (when interference prevention is used: 30 ms or less)			
Indicators	Emitter Job indicator: Orange LED (lights up when the job indicator input is Low (PNP output: lights up when High)) Receiver Stable incident beam indicator: Green LED (lights up when the all beams are stably received) Job indicator: Orange LED (lights up when the job indicator input is Low (PNP output: lights up when High))			
Interference prevention function	Incorporated (Up to 3 units can be closely mounted) (Note 2)			
Ambient temperature	-10 °C to +55 °C (No dew condensation or icing allowed)(Storage: -20 °C to +70 °C)			
Ambient humidity	35 % to 85 % RH (Storage: 35 % to 85 % RH)			
Emitting element	Infrared LED (synchronized scanning system)			
Material	Enclosure: Heat-resistant ABS, Lens: Acrylic indicator cover: Acrylic			
Cable	<2 m cable length type> 0.2 mm ² 4-core (emitter: 3-core) oil resistant cabtyre cable, 2 m long <5 m cable length type> 0.2 mm ² 4-core (emitter: 3-core) oil resistant cabtyre cable, 5 m long			
Weight	Emitter	Receiver	Approx. 50 g	Approx. 110 g

Notes: 1) The model No. with suffix "J" is pigtailed type. (cable length: 0.3 m)
Model No.: NA1-PK3(-PN)-J
For the cable connected with the pigtailed type, use the connection cable CN-24-C2 (cable length: 2 m) (optional) or CN-24-C5 (cable length: 5 m) (optional).
2) For details, refer to "INTERFERENCE PREVENTION FUNCTION".

1 REGULATIONS AND STANDARDS

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2 PART DESCRIPTION



3 MOUNTING

- Use M4 screws with washers and M4 nuts. The tightening torque should be 0.5N·m or less. (Please arrange the screws and the nuts separately.)

4 I/O CIRCUIT DIAGRAMS

5 BEAM ALIGNMENT

- Place the emitter and the receiver face to face along a straight line.
- After the cables have been correctly connected, switch the power ON.
- Move the emitter in the up, down, left and right directions, in order to determine the range of the beam received condition with the help of the operation indicator (red) on the receiver. Then, set the emitter at the center of this range.
- Similarly, adjust for up, down, left and right angular movement of the emitter.
- Further, perform the angular adjustment for the receiver also.
- Check that the stable incident beam indicator (green) lights up.
- Interrupt each beam channel with the actual sensing object, and confirm that the sensor operates correctly.

Note: The stable incident beam indicator (green) lights up when all the three beams are stably received by the receiver.

6 SELECTION OF OUTPUT OPERATION

- The output operation can be selected by the operation / frequency selection switch on the receiver. (Make sure to set the switch in the power supply off condition.)

State of operation / frequency selection switch	Output operation
L-ON	OFF when one or more beams are interrupted.
D-ON	ON when one or more beams are interrupted.

Notes: 1) Selection of the output operation and the frequency for the receiver is carried out with the same switch. When the output operation is set, be sure to select the same frequency No. of the emitter and the receiver.
2) In case the operation / frequency selection switch is set to the position other than 1, 2 or 3, the state of the receiver is in D-ON / frequency 1.

7 INTERFERENCE PREVENTION FUNCTION

- By setting different emission frequencies, three sets of the sensors can be mounted closely as shown on the figure right.

However, if the sensors are mounted closely as shown on the figure right, up to 2 sets of sensors are possible.

8 CAUTIONS

- This product has been developed / produced for industrial use only.
- Make sure that the power supply is off while wiring and operation of the selection switch.
- Take care that wrong wiring may damage the sensor.
- Verify that the supply voltage variation is within the rating.
- Do not use during the initial transient time (0.5 sec.) after the power supply is switched on.

9 SPECIFICATIONS

Type	NPN output		PNP output	
	2 m cable length type	5 m cable length type	2 m cable length type	5 m cable length type
Model No. (Note 1)	NA1-PK3	NA1-PK3-C5	NA1-PK3-PN	NA1-PK3-PN-C5
Sensing height	49.2 mm			
Sensing range	30 mm to 300 mm			
Beam pitch	24.6 mm			
Number of beam channels	3 beam channels			
Sensing object	opaque object			
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Current consumption	Emitter: 30mA or less, Receiver: 50mA or less			
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Ambient temperature	-10 °C to +55 °C (No dew condensation or icing allowed)(Storage: -20 °C to +70 °C)			
Ambient humidity	35 % to 85 % RH (Storage: 35 % to 85 % RH)			
Emitting element	Infrared LED (synchronized scanning system)			
Material	Enclosure: Heat-resistant ABS, Lens: Acrylic indicator cover: Acrylic			
Cable	<2 m cable length type> 0.2 mm ² 4-core (emitter: 3-core) oil resistant cabtyre cable, 2 m long <5 m cable length type> 0.2 mm ² 4-core (emitter: 3-core) oil resistant cabtyre cable, 5 m long			
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- Use M4 screws with washers and M4 nuts. The tightening torque should be 0.5N·m or less. (Please arrange the screws and the nuts separately.)

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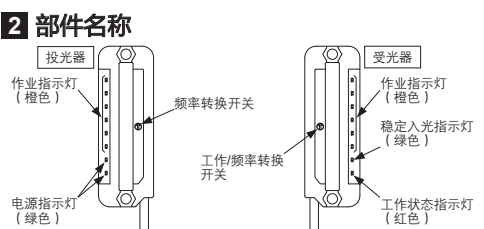
Panasonic 使用说明书

小型拣选传感器 NA1-PK3系列

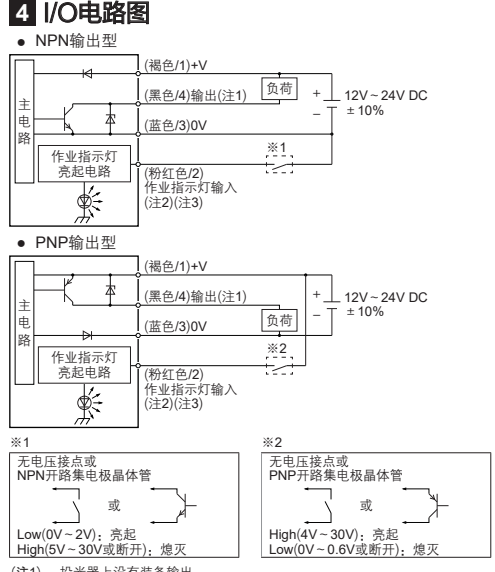
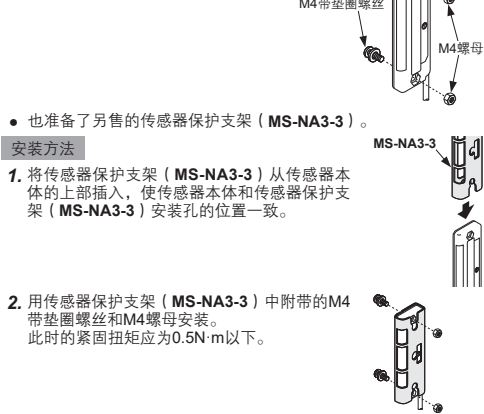
非常感谢您购买Panasonic产品。请仔细阅读、完整地阅读此使用说明书以便正确、合理地使用此产品。请把此使用说明书放在随手可得之处以便快速查找。

- ### 警告
- 如果将本产品作为人体保护用的检测装置使用，可能会导致死亡或严重人身伤害。
 - 请勿将本产品安装在压床、剪切机、轧辊磨床、成形机、硫化机、机器人等上，作为保护操作工人的手、其他身体部分为目的的检测装置使用。
 - 本产品不包含作为安全装置使用时必要的检测自身安全功能的电路。因此，会出现由于故障或误动作引起的检测输出变成ON和OFF的情况。
 - 将本产品作为以下检测装置使用时，若发生相关“法律上”及“产品责任”的问题，恕本公司不予承担责任。
 - 安装在机械·装置上，作为检测进入危险区域操作工人的手、其他身体部分，并停止机械·装置进行检测装置使用。
 - 安装在防止侵入危险区域的装置上，作为检测操作工人的手、其他身体部分，进行门窗开关的检测器使用。
 - 作为人体保护用（包括防干扰线）的检测装置使用。
 - 作为压床的安全装置或其他人体保护为目的的检测时，请使用符合OSHA、ANSI及IEC等各国人体保护用相关规格的产品。

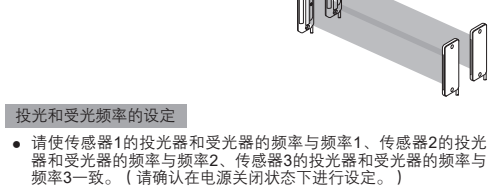
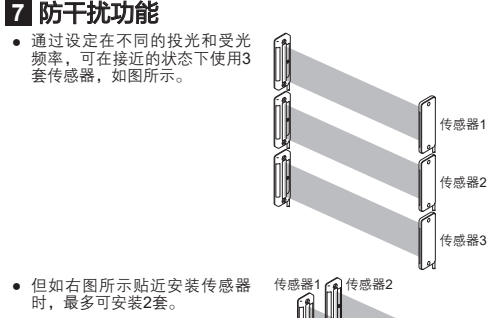
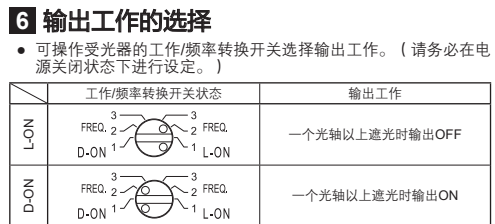
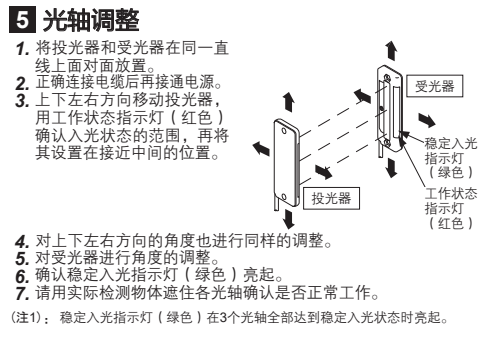
- ### 1 规定/规格
- 本产品适用下列规定/规格。
 - <符合指令/符合法规>
 - EU规定:EMC指令2014/30/EU
 - 英国规定:EMC规定2016/2019
 - 适用规格
 - EN IEC 60947-5-2:2020



- ### 3 安装
- 请使用M4带垫圈螺丝和M4螺母，紧固扭矩应为0.5N·m以下。（请另外准备螺丝和螺母。）



- （注1）：投光器上没有装备输出。
（注2）：将中继连接器型（NA1-PK3-□-J）与连接电缆（CN-24-C□）相连接时，导线颜色为“白”。
（注3）：将作业指示灯作为大型工作状态指示灯使用时，请将投光器和受光器的作业指示灯输入线（粉红色）与受光器的输出线（黑色）连接。
- #### ● 连接器针配置图（中继连接器型）
-
- 1: +V
2: 作业指示灯输入
3: 0V
4: 输出(投光器; 不连接)



		投光器		受光器	
		频率转换开关	工作/频率转换开关	频率转换开关	工作/频率转换开关
传感器1	L-ON	FREQ. 1 D-ON 1	FREQ. 1 D-ON 1	FREQ. 2 D-ON 1	FREQ. 2 D-ON 1
	D-ON	FREQ. 2 D-ON 1	FREQ. 2 D-ON 1	FREQ. 1 D-ON 1	FREQ. 1 D-ON 1
传感器2	L-ON	FREQ. 2 D-ON 1	FREQ. 2 D-ON 1	FREQ. 3 D-ON 1	FREQ. 3 D-ON 1
	D-ON	FREQ. 3 D-ON 1	FREQ. 3 D-ON 1	FREQ. 2 D-ON 1	FREQ. 2 D-ON 1
传感器3	L-ON	FREQ. 3 D-ON 1	FREQ. 3 D-ON 1	FREQ. 4 D-ON 1	FREQ. 4 D-ON 1
	D-ON	FREQ. 4 D-ON 1	FREQ. 4 D-ON 1	FREQ. 3 D-ON 1	FREQ. 3 D-ON 1

（注1）：请注意受光器的频率和输出工作的转换用同一开关进行。
（注2）：频率转换开关及工作/频率转换开关设定在频率1、2、3以外的位置时，投光器为频率1，受光器为D-ON-频率1的状态。

- ### 8 注意事项
- 本产品是以在工业环境中使用为目的而开发、制造的产品。
 - 请务必在电源关闭状态下进行接线作业和转换开关的操作。
 - 错误接线会引起故障。
 - 请确认电源电压的变化不超出额定范围。
 - 如果电源是由通用开关调节器提供，请确保电源机架接地端子（F.G.）接地。
 - 电源接通后的短时间（0.5s）内，请勿使用。
 - 如果在该产品附近使用产生噪音的设备（开关调节器、变频电动机等），请将设备机架接地端子（F.G.）接地。
 - 投光器和受光器的0.3 mm²以上的电缆分别可延长至100 m。但为减少噪音，应使接线尽可能短。
 - 请勿将电缆与高压线或动力线并行接线或在同一管内运行线路，这可能会由于感应而引起误动作。
 - 在有些种类的快速启动灯或高频照明设备的荧光灯下而影响检测性能，请注意不要使其直接受光。
 - 请勿在有过度水蒸气、灰尘等的场所使用本产品。
 - 请勿将传感器与水、油、油脂或有机溶液、如稀释剂等直接接触。
 - DC电源请务必使用隔离变压器。如果使用自耦变压器（单卷变压器），可能会损坏本产品或电源。
 - 使用电源产生浪涌时，请在产生源连接浪涌吸收器以吸收浪涌。
 - 请使投光器和受光器的电缆引线方向一致，若不一致则不会变成入光状态。
 - 开关的转换，需用“-”字型螺丝刀。（端头形状2.5 mm × 0.6 mm）
 - 本产品请勿在户外使用。

9 规格

种 类	NPN输出		PNP输出	
	电缆长2 m型	电缆长5 m型	电缆长2 m型	电缆长5 m型
型 号(注1)	NA1-PK3	NA1-PK3-C5	NA1-PK3-PN	NA1-PK3-PN-C5
检 测 高 度	49.2 mm			
检 测 距 离	30 mm ~ 300 mm			
光 轴 间 距	24.6 mm			
光 轴 数	3光轴			
检 测 物 体	φ29 mm以上的不透明体			
电 源 电 压	12 V ~ 24 V DC ± 10%			
电 源 电 流	12 V DC以下: 约50 mA 24 V DC以下: 约50 mA			
消 耗 电 流	投光器: 30 mA以下 受光器: 50 mA以下			
输 出	NPN开路集电极晶体管		PNP开路集电极晶体管	
	最大流入电流: 100 mA 外加电压: 30 V DC以下 (输出和0 V之间)		最大流出电流: 100 mA 外加电压: 30 V DC以下 (输出和+V之间)	
剩 余 电 压	1 V以下(流入电流为100 mA时)		1 V以下(流出电流为100 mA时)	
	0.4 V以下(流入电流为16 mA时)		0.4 V以下(流出电流为16 mA时)	
输 出 工 作 短 路 保 护	一个光轴以上遮光时ON/OFF 可通过转换开关选择 装备			
反 应 时 间	10 ms以下 (使用防干扰功能时: 30 ms以下)			
指 示 灯	电源指示灯: 绿色LED(通电时亮起)			
	投 光 器	作业指示灯: 棕色LED [作业指示灯输入Low时亮起(PNP输出: High时亮起)]		
受 光 器	工作状态指示灯: 红色LED(输出ON时亮起)			
	稳定入光指示灯: 绿色LED(所有光轴稳定入光时亮起) [作业指示灯输入Low时亮起(PNP输出: High时亮起)]			
防 干 扰 功 能	红外LED(同步光束扫描方式) 装备 (最多可贴近安装3台) (注2)			
周 围 温 度	-10 °C ~ +55 °C (注意不可结露、结冰)			
周 围 湿 度	35 %RH ~ 85 %RH. 存储时: 35 %RH ~ 85 %RH			
投 光 元 件	红红外线LED(同步光束扫描方式)			
材 质	外壳: 耐热ABS. 透镜: 丙烯酸, 指示灯罩: 丙烯酸			
电 缆	<电缆长2 m型>		<电缆长5 m型>	
	0.2 mm ² 4芯 (投光器为3芯) 耐油橡皮绝缘软电缆, 长2 m		0.2 mm ² 4芯 (投光器为3芯) 耐油橡皮绝缘软电缆, 长5 m	
重 量	投 光 器	约50 g	约105 g	约50 g
	受 光 器	约50 g	约110 g	约50 g

（注1）：型号名带“-J”的机型为中继连接器型。（电缆长0.3 m）
型号名: NA1-PK3-(PN)-J
连接至中继连接器型的电缆，请利用另售的匹配电缆CN-24-C2（电缆长2 m）或CN-24-C5（电缆长5 m）。
（注2）：关于详细内容请参阅“防干扰功能”。

- ### 10 产品中有害物质的名称及含量
- | 部件名称 | 有害物质 | | | | | |
|---------|-------|-------|-------|-------------|-----------|------------|
| | 铅(Pb) | 汞(Hg) | 镉(Cd) | 六价铬(Cr(VI)) | 多溴联苯(PBB) | 多溴二苯(PBDE) |
| 安装电路板 | × | × | ○ | ○ | ○ | ○ |
| 外装部件(※) | ○ | × | ○ | ○ | ○ | ○ |
| 包装配件 | ○ | ○ | ○ | ○ | ○ | ○ |
- A: NA1-PK3-□; B: NA1-PK3-□-J
本表格依据SJ/T 11364的规定编制。
○: 表示该有害物质在该部件所有均质材料中的含量均在GB/T 26572规定的限量要求以下。
×: 表示该有害物质至少在该部件的某一均质材料中的含量超出GB/T 26572规定的限量要求。
- (※): 外装部件包括外廓壳体、标牌类、光学学零件、电缆、连接器、配线用螺丝、端子、安装支架等零件。
- <批号含义>
GL1N(2016年12月生产)
L月[A(1月)、B(2月)、C(3月)]...L(12月)]
西历[A(10年)、B(11年)、C(12年)]...J(19年)]
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