

REFERENCE

SPEC No. ED-08G002
ISSUE January 10, 2008

SHARP

OPTO-ANALOG DEVICES DIVISION
ELECTRONIC COMPONENTS GROUP
SHARP CORPORATION

SPECIFICATION

DEVICE SPECIFICATION FOR

1 Bit Output Type Distance Measuring Sensor

MODEL No.

GP2Y0D810Z1F

Specified for

Enclosed please find copies of the Specifications which consists of 9 pages including cover.
After confirmation of the contents, please be sure to send back copies of the Specifications
with approving signature on each.

CUSTOMER'S APPROVAL

DATE

BY

PRESENTED

DATE

BY

Y. Oda
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Department General Manager of
Engineering Dept.,III
Opto-Analog Devices Division
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SHARP CORPORATION

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GP2Y0D810Z1F
January. 10, 2008Product name : 1 bit output distance measuring sensorModel No. : GP2Y0D810Z1F

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2. When using this product, please observe the absolute maximum ratings and the instructions for use outlined in these specification sheets, as well as the precautions mentioned below. Sharp assumes no responsibility for any damage resulting from use of the product which does not comply with the absolute maximum ratings and the instructions included in these specification sheets, and the precautions mentioned below.

(Precautions)

- (1) This product is designed for use in the following application areas ;

• Computers • OA equipment • Telecommunication equipment (Terminal)
• Measuring equipment • Tooling machines • Audio visual equipment
• Home appliances

If the use of the product in the above application areas is for equipment listed in paragraphs (2) or (3), please be sure to observe the precautions given in those respective paragraphs.

- (2) Appropriate measures, such as fail-safe design and redundant design considering the safety design of the overall system and equipment, should be taken to ensure reliability and safety when this product is used for equipment which demands high reliability and safety in function and precision, such as ;

• Transportation control and safety equipment (aircraft, train, automobile etc.)
• Traffic signals • Gas leakage sensor breakers • Rescue and security equipment
• Other safety equipment .

- (3) Please do not use this product for equipment which require extremely high reliability and safety in function and precision, such as ;

• Space equipment • Telecommunication equipment (for trunk lines)
• Nuclear power control equipment • Medical equipment .

- (4) Please contact and consult with a Sharp sales representative if there are any questions regarding interpretation of the above three paragraphs.

3. Please contact and consult with a Sharp sales representative for any questions about this product.

1. Application

This specification applies to the outline and characteristics of the 1 bit output distance measuring sensor ;
Model No. G P 2 Y 0 D 8 1 0 Z 1 F.

2. Outline

Refer to the attached drawing No. C Y 1 4 1 8 4 i 0 2

3. Ratings and characteristics

Refer to the attached sheet, page 4, 5.

4. Reliability

Refer to the attached sheet, Page 6.

5. Outgoing inspection

Refer to the attached sheet, Page 6.

6. Supplements

6-1 G P 2 Y 0 D 8 1 0 Z 1 F Example of Output distance characteristics

Refer to the attached sheet, page 7.

6-2 This product shall not contain the following materials.

Also, the following materials shall not be used in the production process for this product.

Materials for ODS : CFCs, Halon, Carbon tetrachloride 1.1.1-Trichloroethane (Methyl chloroform)

6-3 This manufacture does not contain the chemical materials regulated by RoHS directive.

(except for the parts NOT regulated by RoHS)

6-4 Product mass : Approx. 0.7g

6-5 Compliance with each regulation

6-5-1 The RoHS directive(2002/95/EC)

This product complies with the RoHS directive(2002/95/EC).

Object substances: mercury, lead (except for lead in glass of electronic components), cadmium, hexavalent chromium, polybrominated biphenyls (PBB) and polybrominated diphenyl ethers (PBDE)

6-5-2. Content of six substances specified in Management Methods for Control of Pollution Caused by Electronic Information

Products Regulation (Chinese : 电子信息产品污染控制管理办法).

| Category | Toxic and hazardous substances | | | | | |
|---------------------------|--------------------------------|--------------|--------------|---|--------------------------------|---------------------------------------|
| | Lead (Pb) | Mercury (Hg) | Cadmium (Cd) | Hexavalent chromium (Cr ⁶⁺) | Polybrominated biphenyls (PBB) | Polybrominated diphenyl ethers (PBDE) |
| Distance measuring sensor | * | ✓ | ✓ | ✓ | ✓ | ✓ |

✓ : indicates that the content of the toxic and hazardous substance in all the homogeneous materials of the part is below the concentration limit requirement as described in SJ/T 11363-2006 standard .

* : indicates that the content of the toxic and hazardous substance in at least one homogeneous material of the part exceeds the concentration limit requirement as described in SJ/T 11363-2006 standard.

Lead in glass of electronic components (designated by “*” in the above table) are exempt from the RoHS directive (2002/95/EC), because there is no effective way to eliminate or substitute them by present scientific technology.

7. Notes

Refer to the attached sheet, page 8.

8. Packing specification

Refer to the attached sheet, page 9.

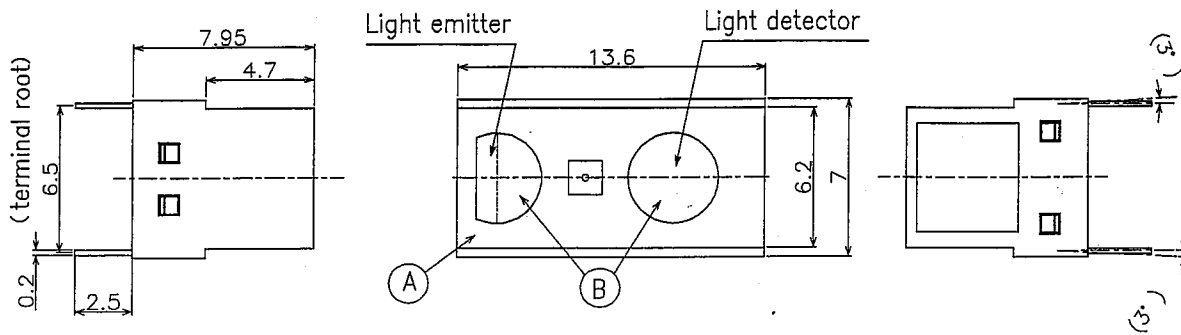
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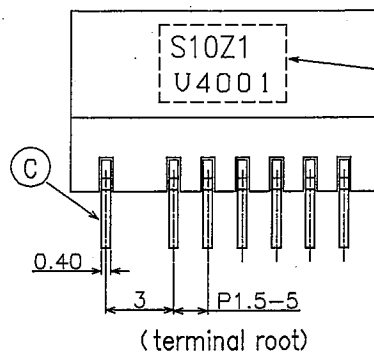
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2. Outline



| terminal name |
|---------------|
| ① Cathode |
| ② LED_FB |
| ③ LED |
| ④ GND |
| ⑤ — |
| ⑥ — |
| ⑦ REG |
| ⑧ — |
| ⑨ — |
| ⑩ — |
| ⑪ Vcc |
| ⑫ Vin |
| ⑬ Vo |
| ⑭ Anode |

- : No contact

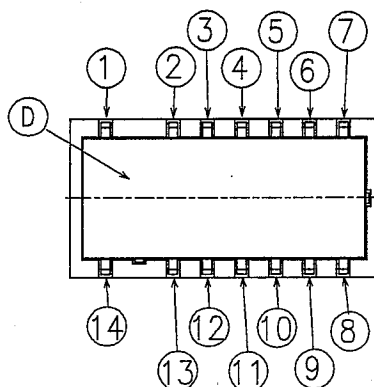


Stamp (Example)

SHARP: [S]
S10Z1 GP2Y0D810Z1F
: [10Z1]
U 4 0 0 1 LOT No.
Month (1 + 09, 0, N, D)
(DIN Standard symbol)
Year (DIN Standard symbol)

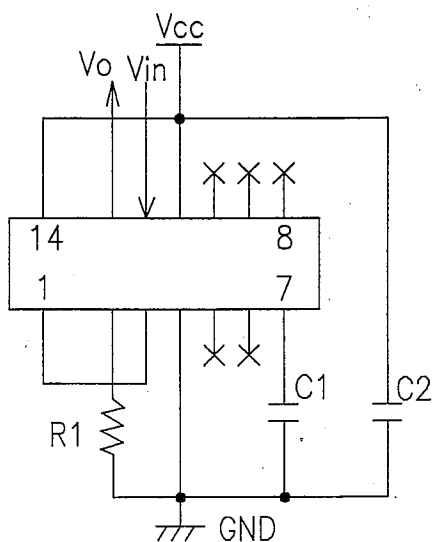
DIN Standard year production
(Remove G, I, O, Q, Y, Z)
(It repeats itself by a period for 20 years)

| Year | Symbol |
|------|--------|
| 2006 | U |
| 2007 | V |
| 2008 | W |
| 2009 | X |
| ⋮ | ⋮ |
| 2025 | T |
| 2026 | U |



Material

| Material | Case | PC (Color:Black) |
|----------|----------------|----------------------------|
| A | Case | PC (Color:Black) |
| B | Lens | PC(Visible light cut type) |
| C | Device coating | PPS(Color:Black) |
| D | Lead pin | 42ALLOY (Pd-Au plating) |



C1 · C2 = 0.1 μF

(Note1) Unspecified tolerances shall be ±0.3mm.

(Note2) () : Reference value

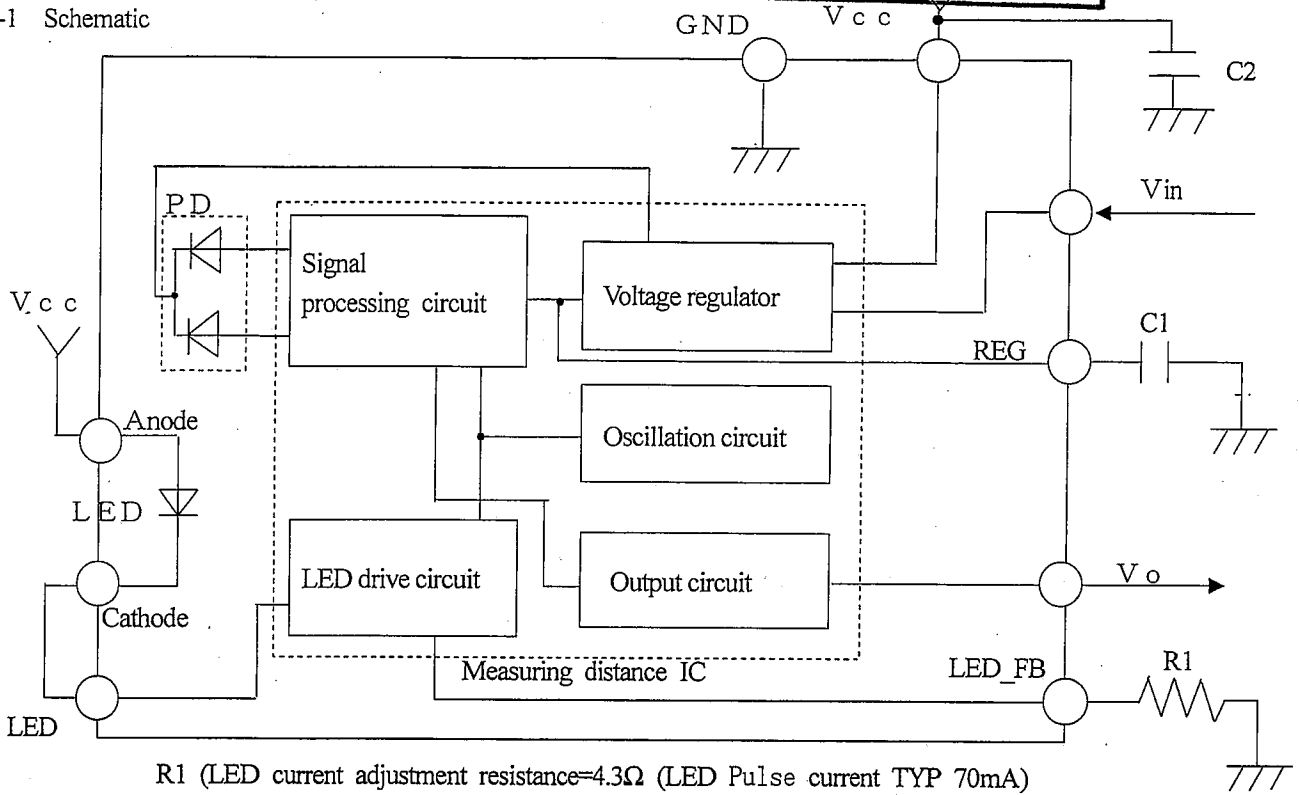
Unit: mm Scale: 3/1

| | |
|-------------|------------------------------------|
| Name | GP2Y0D810Z1F Outline Dimensions |
| Drawing No. | CY14184i02 |

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3-1 Schematic



R1 (LED current adjustment resistance)=4.3Ω (LED Pulse current TYP 70mA)
C1 · C2=0.1μF

3-2 Absolute maximum ratings

| Parameter | Symbol | Ratings | Unit | Remark |
|-------------------------|--------|-----------------|------|---|
| Supply voltage | Vcc | -0.3 to +7 | V | - |
| Output terminal voltage | Vo | -0.3 to Vcc+0.3 | V | - |
| Input terminal voltage | Vin | -0.3 to Vcc+0.3 | V | - |
| Operating temperature | Topr | -40 to +85 | °C | - |
| Storage temperature | Tstg | -40 to +85 | °C | - |
| Soldering temperature | Tsol | 260 | °C | 5s or less/time up 2 times t=1.0mm One side board mounting |

Recommended operating conditions

| Parameter | Symbol | Rating | Unit | Remark |
|--------------------------|--------|-------------|------|----------------------------------|
| Supply voltage | Vcc | 2.7 to 6.2 | V | - |
| High level input voltage | VinH | MIN Vcc-0.2 | V | CMOS level signal. Operating |
| Low level input voltage | VinL | MAX 0.2 | V | CMOS level signal. Standby state |

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3-3 Electro-optical Characteristics

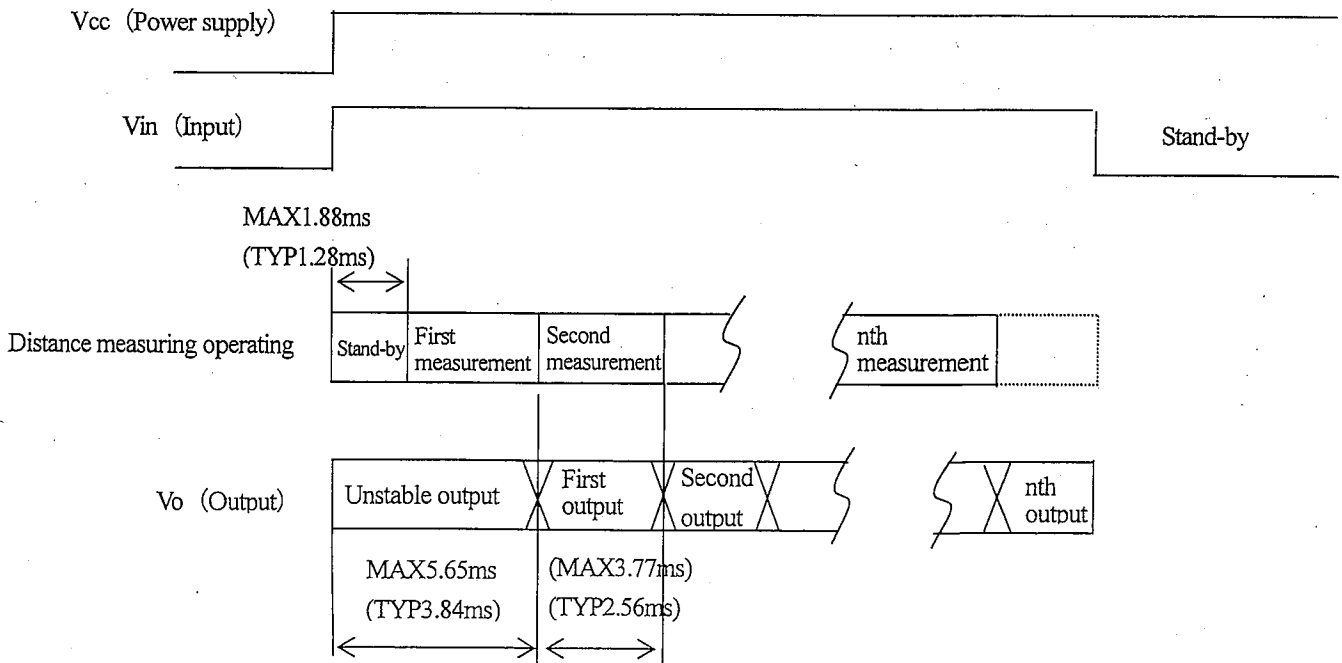
(Ta=25°C, Vcc=5V)

| Parameter | Symbol | Conditions | MIN. | TYP. | MAX. | Unit |
|---------------------------------|--------|-------------------------------|---------|------|------|------|
| Output terminal voltage | VoH | Output voltage at high level | Vcc-0.6 | - | - | V |
| | VoL | Output voltage at low level | - | - | 0.6 | V |
| Output distance characteristics | Vo | (*1)(*2) | 80 | 100 | 130 | mm |
| Average supply current | Icc 1 | Vcc=5V Vin=5V R1=4.3Ω (*3) | - | 5 | 6.5 | mA |
| Average supply current | Icc 2 | Vcc=5V Vin=5V R1=4.3Ω (*3) | - | 9 | 10.5 | mA |
| Stand-by supply current | Icc 3 | Vcc=5V Vin=0V | - | 5 | 8 | μA |

※ L: Distance to reflective object

- (*1) Using reflective object : White paper (Made by Kodak Co., Ltd. gray cards R-27 • white face, reflectance ; 90%)
- (*2) Output switching has a hysteresis width.
The distance specified by Vo should be the one with which the output H switches to the output L.
- (*3) Icc1:(LED Emitting time:TYP20 μs, 8times) Icc2:(Emitting time:TYP20 μs, 15times)
LED Pulse Current: TYP 70mA

3-4 Timing chart



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4. Reliability

The reliability of products shall be satisfied with items listed below.

Confidence level : 90%

LTPD : 20 or 30

| No. | Test Items | Test Conditions | Failure Judgement Criteria | Samples (n) |
|-----|--------------------------------------|---|--|---------------|
| | | | | Defective (c) |
| 1 | Temperature cycling | 1 cycle -40°C to +85°C (30min.) (30min.) 25 cycle test | Initial × 0.8 > Vo Vo > Initial × 1.2 (Note 1) | n=11, c=0 |
| 2 | High temp. and high humidity storage | +60°C, 90%RH, 500h | | n=11, c=0 |
| 3 | High temp. storage | +85°C, 500h | | n=11, c=0 |
| 4 | Low temp. storage | -40°C, 500h | | n=11, c=0 |
| 5 | Operation life (High temp.) | +60°C, Vcc=5V, 500h | | n=11, c=0 |
| 6 | Soldering heat | Tsol=260°C, 5s or less/time up 2 times t=1.0mm One side borad mounting | | n=11, c=0 |
| 7 | Mechanical shock | 1000m/s ² , 6.0ms 3times/±X, ±Y, ±Z direction | | n=8, c=0 |
| 8 | Variable frequency vibration | 10 to 55 to 10Hz/1min. 2h/X, Y, Z direction overall amplitude : 1.5mm | | n=8, c=0 |

(Note 1) Test conditions are according to 3-3 Electro-optical characteristics.

(Note 2) After test, measurement shall be carried out after leaving under the normal temperature and the normal humidity for two hours. But no dew drop.

5. Outgoing inspection

(1) Inspection lot

Inspection shall be carried out per each delivery lot.

(2) Inspection items

A single sampling plan, normal inspection level II based on ISO 2859 is applied.

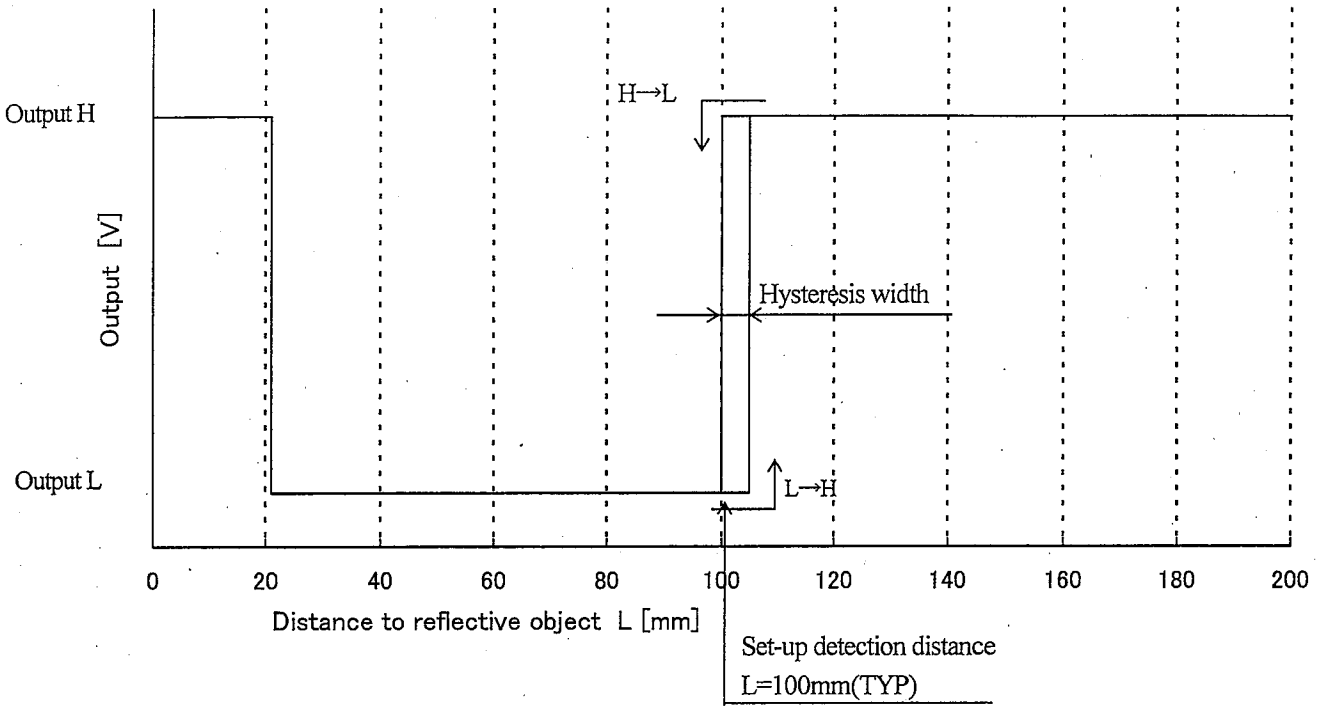
The AQL according to the inspection items are shown below.

| Defect | Inspection item | AQL (%) |
|--------------|---|---------|
| Major defect | Electro-optical characteristics defect (In para. 3-3) | 0.4 |
| Minor defect | Defect on appearance and dimension ※ Crack, chip, scratch, stain | 1.0 |

※ Crack, chip, scratch, stain

One which affects the characteristics of para. 3-3 shall be defect.

6-1. GP2Y0D810Z1F Example of Output distance characteristics



7. Notes

[Advice for the optics]

7-1 Lens of this device shall be kept cleanly. There are cases that dust, water or oil and so on deteriorate the characteristics of this device. Please consider it at actual application.

7-2 In case that protection is set in front of the emitter and detector portion, the protection cover which has the most efficient transmittance at the emitting wavelength range of LED for this product ($\lambda=870\text{nm}\pm 50\text{nm}$), shall be recommended to use. The face and back of protection cover should be mirror polishing. Also, as there are cases that the characteristics may not be satisfied with according to the distance between the protection cover and this product or the thickness of the protection cover, please use this product after confirming the operation sufficiently in actual application.

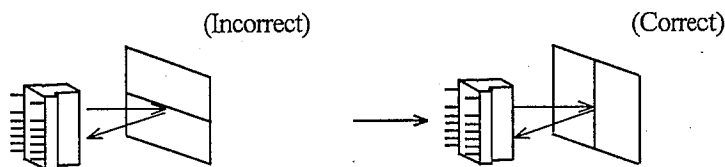
[Advice for the characteristics]

7-3 In case that there is an object near to light exits of the sensor between the sensor and the detected object, please use this device after confirming sufficiently whether the characteristics of this sensor do not change by the object.

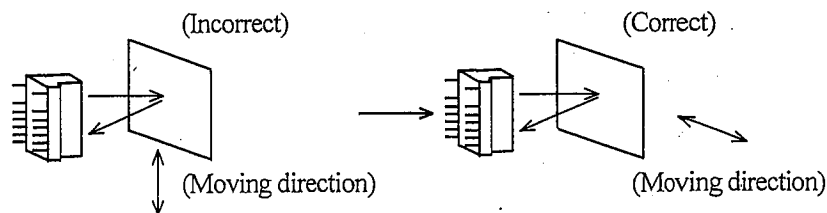
7-4 When the detector surface receive direct light from the sun, tungsten lamp and so on, there are cases that the distance can not be measured exactly. Please consider the design that the detector does not receive direct light from such light source.

7.5 Distance between sensor and mirror reflector can not sometimes measure exactly.
By changing the mounting angle of this product, it may measure the distance exactly.

7.6 In case that reflective object has boundary line clearly, there is cases that distance can not measure exactly.
At that time, if direction of boundary line and the line between emitter center and detector center are parallels, it is possible to decrease deviation of measuring distance.



7-7 In order to decrease measuring error due to moving direction of object, we recommend that the sensor be mounted like the drawing below.



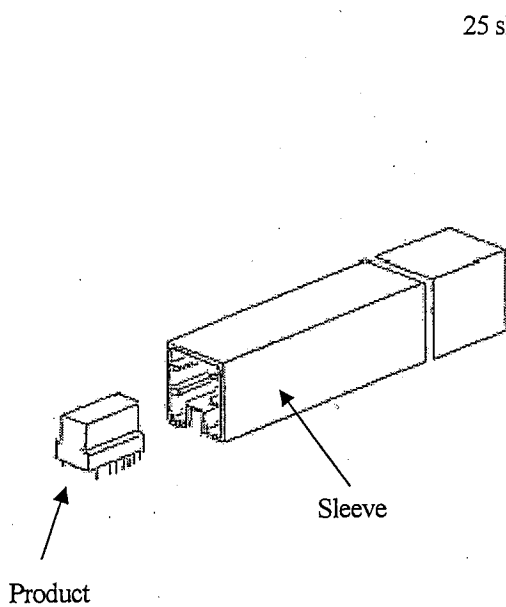
[Notes on handling]

7-8 Please don't do washing. Washing may deteriorate the characteristics of optical system and so on.
Please confirm resistance to chemicals under the actual usage since this product has not been designed against washing.

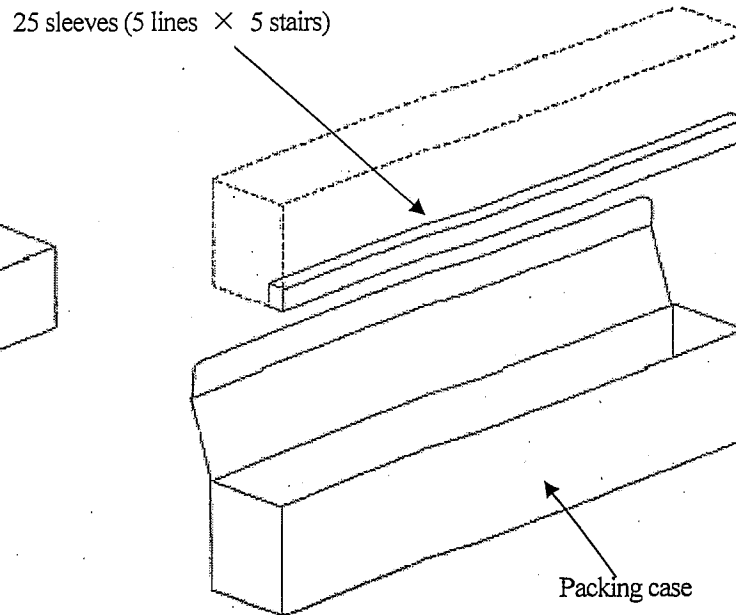
7-9 Soldering shall be done with a soldering iron and below 260°C , less than 5s and maximum 2 times.
Also, please pay attention not to put outer force on lead terminals while soldering.
Please do not apply flow soldering because it may damage optical lens of the device.

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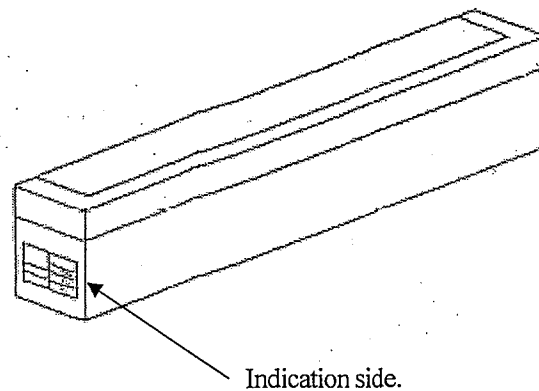
8. Packing specification



(Fig.1)



(Fig.2)



(Fig.3)

Packaging method

1. Products of appointed quantity shall be packaged in a sleeve and both of sleeve edge shall be fixed by stopper.
MAX. 40 pieces per sleeve. (Fig.1)

The above figure shows the method of storing the product.

2. 25 sleeves shall be packaged in a packing case. (Fig.2)

3. Fix the packing case by craft tape, and fill in the blanks of Model No., Quantity and Inspection date.. (Fig. 3)

4.(Quantity per a packing case : 1000pcs.)Outside : 607×64×77 (mm)

5. 5.Indication

The contents of the indication conforms to EIAJ C-3 and the following items are indicated.

Model no., Internal production control name, Quantity, Packing date, Corporate name, Country of origin