

MEASURING DISTANCE TYPE
OBSTACLE DETECTION SENSOR
PBS-03JN

SPECIFICATIONS





Europe's Official HOKUYO Distributor

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CE

RoHS 

| | | | | | |
|---|--|----------|-------------|---|-------------|
|  × 1 | Add a history (change model number of conductive film) | 6 | Mar.13'08 | Yamamoto | PR-5424 |
|  × 2 | Stipulate CE mark , EMC number and RoHS | 1, 4 | Jan.9'08 | Yamamoto | PR-5388 |
| Symbol | Amended reason | Pages | Date | Corrector | Amended No. |
| Approved by | Checked by | Drawn by | Designed by | Title Measuring Distance Type Obstacle Detection Sensor PBS-03JN Specifications | 1/6 |
| | | | TERAWAKI | | |



1. General

(1) Operating principle

Operating principle is that semicircular field is scanned by LED($\lambda = 880\text{nm}$) and the coordinates is calculated by measuring distance to object and its step angle and it detects obstacle in setting area.

(2) Detecting area setting

Shape of detection and setting value can be changed by PC(RS-232C). Detecting distance with 3 steps output for each detecting area can be set.

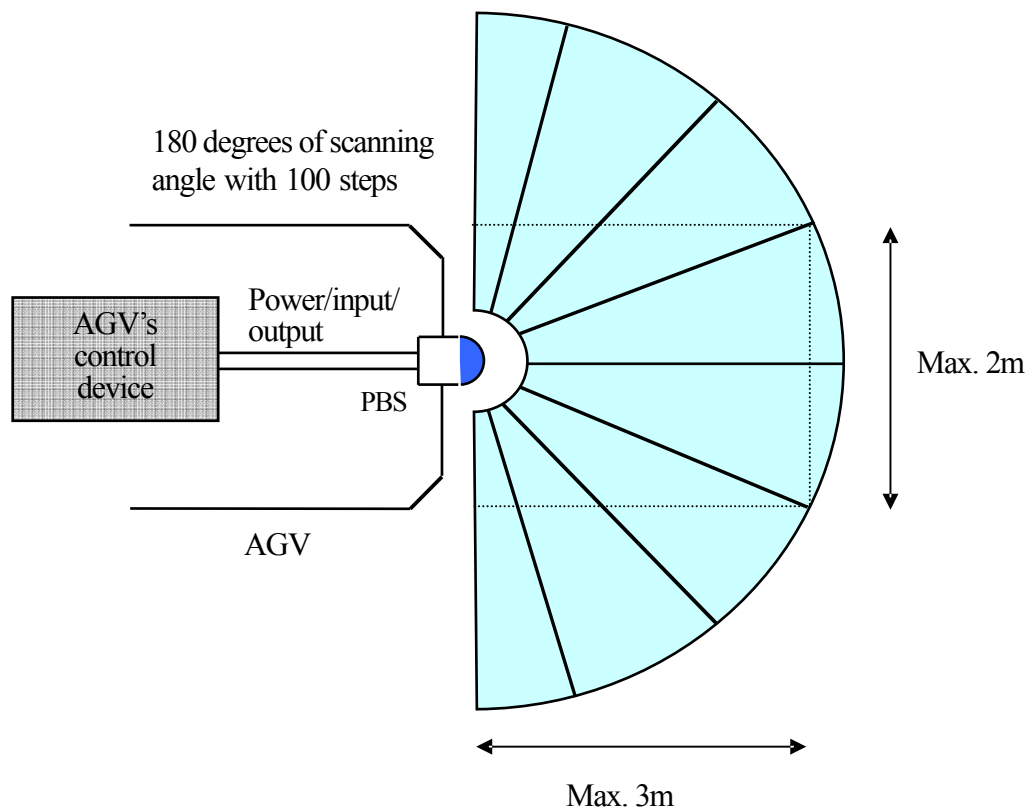
(3) Detecting area changeover

Max. 15 kinds(different from the type) of area changeover that was set by PC beforehand can be made by outer bit input.

(4) Trouble output

This device provides self-diagnosis function such as LED emission or motor revolution trouble and this output executes when such trouble.

2. Structure(Light scanning image)




3.Specifications

| | |
|--|--|
| Model No. | PBS-03JN |
| Power source | 24VDC(Operating range 18 to 30VDC, ripple within 10%) |
| Current consumption | 250mA or less(100mA or less when emission stops) |
| Detectable object and detecting distance | White kent paper with 300 ×300mm(Placed in parallel with receiving surface) Area with vertical direction 0.2 to 3m and width 2m(Origin point is scanning center position) but within scanning angle 180 degrees |
| Hysteresis | It specifies the width when each area setting(fixed 10%) 10% of detecting distance(It is not getting 60mm or less) 5% of detecting distance(It is not getting 30mm or less) |
| Output(Note) | Photo-coupler/open-collector output(30VDC 50mA Max.) Output 1 : OFF when detected in area Output 2 : OFF when detected in area Output 3 : OFF when detected in area(Except for synchronous type) Trouble output : ON during normal operation (Note) Output 1 to 3 show the state it is detecting object when this output executes |
| Response time | Normal operating mode : 180ms or less(Scanning time 100ms/1 rev.) Low-speed scanning mode : 200ms or less(Scanning time 110ms/1 rev.) 2-scanning operating mode : the above time + each scanning time Note) When area changeover, further 1 scanning time is delayed. |
| Starting time | Within 1s after putting power source on or stopping LED emission |
| Lamps | Power lamp(Green) : Flickers when troubled Output 1 lamp(Orange) : Lights up when detected in area Output 2 lamp(Orange) : Lights up when detected in area Output 3 lamp(Orange) : Lights up when detected in area |
| Connection method | Lead wire 1m long |
| Ambient illuminance | Halogen/mercury lamp : 10000lux or less Fluorescent lamp : 6000lux(Max. illuminance) Note) It may malfunction when receiving strong light such as sun light etc. |
| Ambient temperature/humidity | -10 to +50 degrees C, 85%RH or less(Not condensing and icing) |
| Vibration resistance | 10 to 55Hz, double amplitude 1.5mm Each 2 hour in X, Y and Z directions |
| Impact resistance | 490m/s ² (50G) Each 10 time in X, Y and Z directions |
| Protective structure | IP64 |
| Weight | 500g |
| Life | 5 years during normal temperature(motor life) |
| Material | Front case : Polycarbonate, rear case : ABS |
| Setting of detecting area | Setting of output 1 : It is free to set from 0 to 10m for optical axis direction with 7 points pointer. (Note) Setting of output 2 : Linear setting to progressive direction Fan-shaped setting to optical axis direction Percentage(%) setting against output 1 pointer Setting of output 3 : Same as output 2 |

(Note) It can set detecting area up to 10m but it isn't under our guarantee.

| | | | | |
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| Operating mode | 2-scanning mode(When each detecting area setting, it sets individually for output 1 to 3.) It judges existing obstacle with continuous 2-scanning It judges with 1 scanning under normal operating | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|--|----------------|------------|-----------|---------------|---------------|----|----|----|----|---------------|-----|----|----|----|--------|----|-----|----|----|--------|-----|-----|----|----|--------|----|----|-----|----|--------|-----|----|-----|----|--------|----|-----|-----|----|--------|-----|-----|-----|----|--------|----|----|----|-----|--------|-----|----|----|-----|--------|----|-----|----|-----|---------|-----|-----|----|-----|---------|----|----|-----|-----|---------|-----|----|-----|-----|---------|----|-----|-----|-----|---------|-----|-----|-----|-----|---------|
| | Mirror reflecting avoidance mode(It sets when each detecting area setting) It hardly detects the objects with high reflectance 20m away but min. detecting width at 3m is getting 400mm. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Low-speed scanning mode(Set by software switch) Scanning time 100ms(100ms when normal operating) Response delay by mutual interference with PBS with normal operating is made within 1 scanning. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Input and each area | Photo-coupler input(Anode common, Each input ON current 4mA) Setting detecting area changeover Set area No. by [Input 1], [Input 2], [Input 3] and [Input 4] Stop emission by getting all [Input 1], [Input 2], [Input 3] and [Input 4] to ON (OFF : H level input, ON : L level input) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | <table border="1"> <thead> <tr> <th>[Input 1]</th> <th>[Input 2]</th> <th>[Input 3]</th> <th>[Input 4]</th> <th>Area patterns</th> </tr> </thead> <tbody> <tr> <td>ON</td> <td>ON</td> <td>ON</td> <td>ON</td> <td>Emission stop</td> </tr> <tr> <td>OFF</td> <td>ON</td> <td>ON</td> <td>ON</td> <td>Area 1</td> </tr> <tr> <td>ON</td> <td>OFF</td> <td>ON</td> <td>ON</td> <td>Area 2</td> </tr> <tr> <td>OFF</td> <td>OFF</td> <td>ON</td> <td>ON</td> <td>Area 3</td> </tr> <tr> <td>ON</td> <td>ON</td> <td>OFF</td> <td>ON</td> <td>Area 4</td> </tr> <tr> <td>OFF</td> <td>ON</td> <td>OFF</td> <td>ON</td> <td>Area 5</td> </tr> <tr> <td>ON</td> <td>OFF</td> <td>OFF</td> <td>ON</td> <td>Area 6</td> </tr> <tr> <td>OFF</td> <td>OFF</td> <td>OFF</td> <td>ON</td> <td>Area 7</td> </tr> <tr> <td>ON</td> <td>ON</td> <td>ON</td> <td>OFF</td> <td>Area 8</td> </tr> <tr> <td>OFF</td> <td>ON</td> <td>ON</td> <td>OFF</td> <td>Area 9</td> </tr> <tr> <td>ON</td> <td>OFF</td> <td>ON</td> <td>OFF</td> <td>Area 10</td> </tr> <tr> <td>OFF</td> <td>OFF</td> <td>ON</td> <td>OFF</td> <td>Area 11</td> </tr> <tr> <td>ON</td> <td>ON</td> <td>OFF</td> <td>OFF</td> <td>Area 12</td> </tr> <tr> <td>OFF</td> <td>ON</td> <td>OFF</td> <td>OFF</td> <td>Area 13</td> </tr> <tr> <td>ON</td> <td>OFF</td> <td>OFF</td> <td>OFF</td> <td>Area 14</td> </tr> <tr> <td>OFF</td> <td>OFF</td> <td>OFF</td> <td>OFF</td> <td>Area 15</td> </tr> </tbody> </table> | [Input 1] | [Input 2] | [Input 3] | [Input 4] | Area patterns | ON | ON | ON | ON | Emission stop | OFF | ON | ON | ON | Area 1 | ON | OFF | ON | ON | Area 2 | OFF | OFF | ON | ON | Area 3 | ON | ON | OFF | ON | Area 4 | OFF | ON | OFF | ON | Area 5 | ON | OFF | OFF | ON | Area 6 | OFF | OFF | OFF | ON | Area 7 | ON | ON | ON | OFF | Area 8 | OFF | ON | ON | OFF | Area 9 | ON | OFF | ON | OFF | Area 10 | OFF | OFF | ON | OFF | Area 11 | ON | ON | OFF | OFF | Area 12 | OFF | ON | OFF | OFF | Area 13 | ON | OFF | OFF | OFF | Area 14 | OFF | OFF | OFF | OFF | Area 15 |
| | [Input 1] | [Input 2] | [Input 3] | [Input 4] | Area patterns | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | ON | ON | ON | ON | Emission stop | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | OFF | ON | ON | ON | Area 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | ON | OFF | ON | ON | Area 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | OFF | OFF | ON | ON | Area 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | ON | ON | OFF | ON | Area 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | OFF | ON | OFF | ON | Area 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | ON | OFF | OFF | ON | Area 6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | OFF | OFF | OFF | ON | Area 7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | ON | ON | ON | OFF | Area 8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | OFF | ON | ON | OFF | Area 9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | ON | OFF | ON | OFF | Area 10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | OFF | OFF | ON | OFF | Area 11 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ON | ON | OFF | OFF | Area 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| OFF | ON | OFF | OFF | Area 13 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ON | OFF | OFF | OFF | Area 14 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| OFF | OFF | OFF | OFF | Area 15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Input response time | Input taking-in cycle : 1 scanning time(100ms or 110ms) (When selecting emission stop by external input, input taking-in cycle is 1msec) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| EMC standard  | (EMI) EN61000-6-4:2001, EN55011:1998/A1:1999/A2:2002(Group 1 ClassA) (EMS) EN61000-6-2:2005, EN61000-4-2:1995+A1:1998+A2:2001, EN61000-4-3:2002+A1:2002, EN61000-4-4:1995+A1:2001+A2:2001, EN61000-4-6:1996+A1:2001, EN61000-4-8:1993+A1:2001 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Title | Measuring Distance Type Obstacle Detection Sensor PBS-03JN Specifications | Drawing No. | C-42-3178A | 4/6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

4. Cables and signals

| Colors | Functions |
|---------------|---------------------|
| Black | Output 1 |
| White | Output 2 |
| White(Blue) | Output 3 |
| Orange | Trouble output |
| Gray | Output common minus |
| Red | Input common plus |
| Green | Input 1 |
| Yellow | Input 2 |
| Purple | Input 3 |
| White(Yellow) | Input 4 |
| Brown | +VIN |
| Blue | -VIN |
| Yellow(Red) | Serial input(RXD) |
| Yellow(Green) | Serial output(TXD) |
| Yellow(Black) | Serial GND |

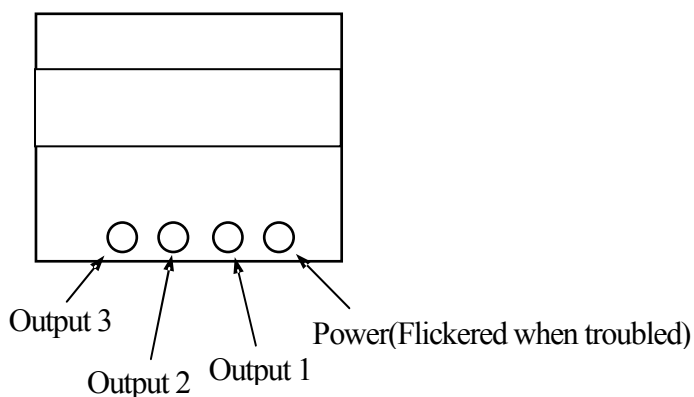
Note : Colors in parenthesis indicate ink color of both sides line printing. Connect unused input wires to input common plus(Red) or open it. Connect unused output wires to output common minus(Gray) or open it. Input/output direction is mentioned on the basis of PBS.

5. Notice when installation

Don't close projection/reception part or interrupt the view when installation. It doesn't operate correctly. Refer to instruction manual.

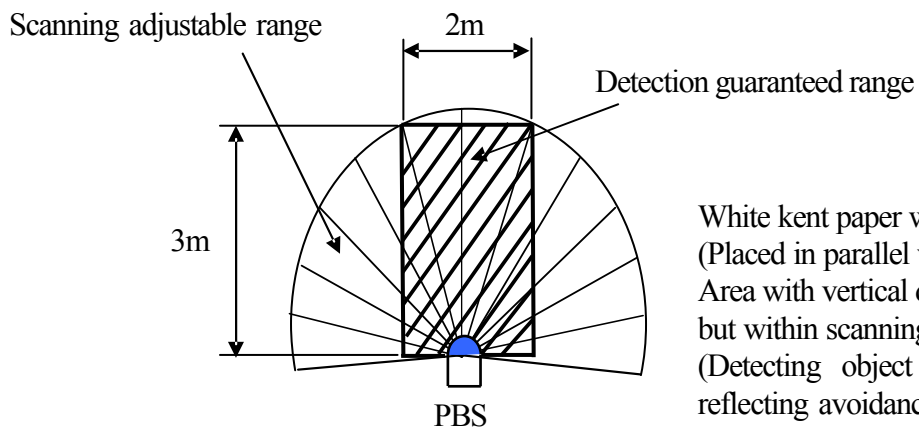
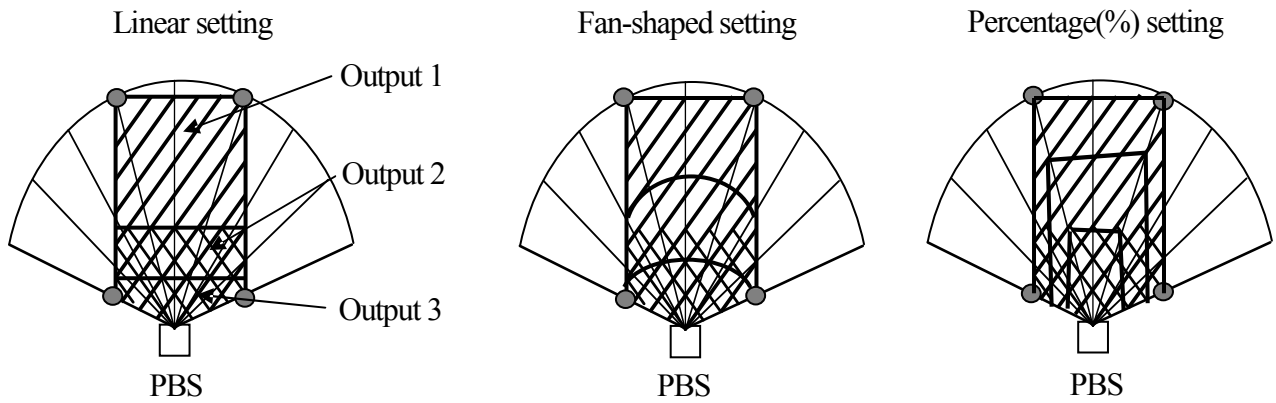
Note) Make sure to install PBS with 50mm or more(Detecting range 180 degrees) forward from AGV's cover etc. When detecting range is 160 degrees, it should be 40mm or more.(Refer to external dimension No.MC-40-3030)

6. LED arrangement



7. Detecting guaranteed range and detecting area diagram

PBS shows detecting area on the basis of scanning center position.

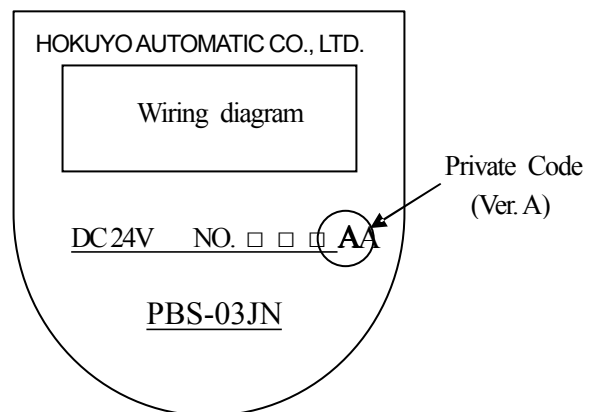


White kent paper with 300 ×300mm
 (Placed in parallel with sensor reception surface)
 Area with vertical direction 0.2 to 3m and width 2m
 but within scanning angle 180 degrees
 (Detecting object width is larger under mirror
 reflecting avoidance mode)

Detection area can be set up to 19 degrees for right/left(full angle 218 degrees, 121 steps) to oblique backward directions by editing area with PC but it can't be guaranteed.

8. Change history

Ver. A : Model number of Conductive filter have been changed dated March, 2008 because of being discontinued.
 (It's changed No.150BT3-125N to No.300R)



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