Aug.7th'02

C-42-3178

MEASURING DISTANCE TYPE
OBSTACLE DETECTION SENSOR
PBS-03JN

SPECIFICATIONS

⚠	All pages revised				All pages	Apr.4'03	Terawaki	PR-4604
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			
			TERAWAKI	Drawing No.	C-42-3178			1/6

HOKUYO AUTOMATIC CO.,LTD.

1. General

(1) Operating principle

Operating principle is that semicircular field is scanned by LED(lambda = 880nm) 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.
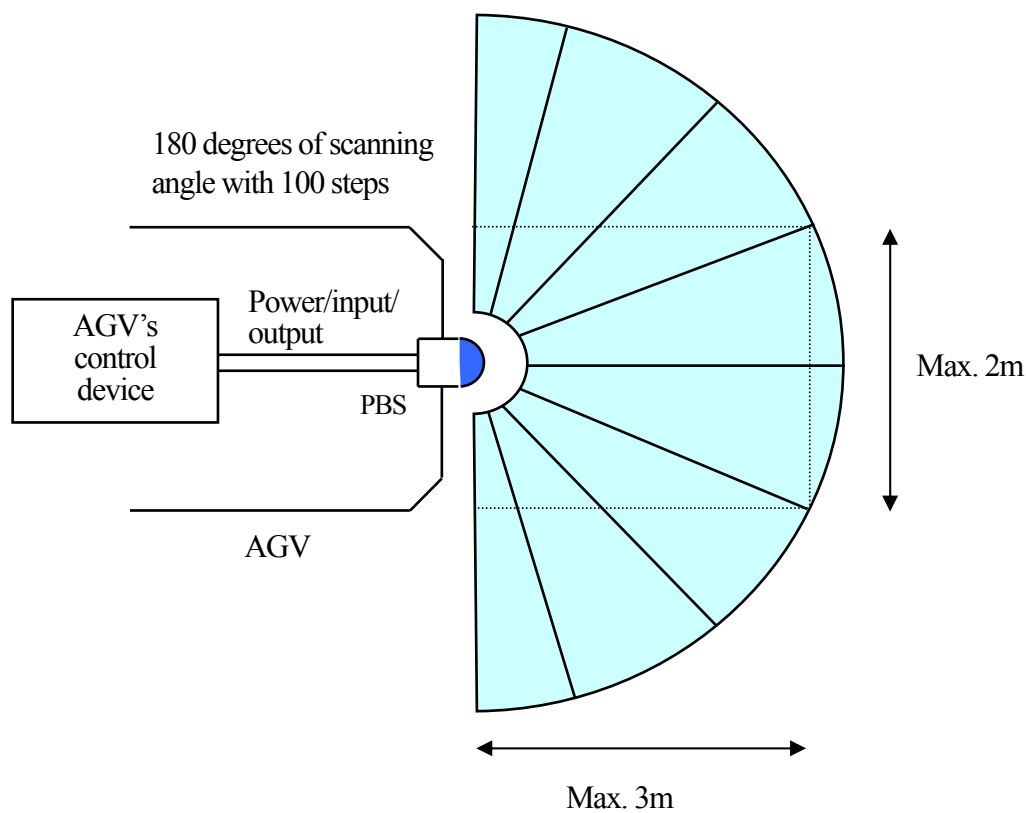
(3)Detecting area changeover

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)

180 degrees of scanning angle with 100 steps

AGV's control device

Power/input/output

PBS

AGV

Max. 2m

Max. 3m

Title	Measuring Distance Type Obstacle Detection Sensor PBS-03JN Specifications	Drawing No.	C-42-3178	2/6

HOKUYO AUTOMATIC CO.,LTD.

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 detection distance	White kent paper with 300×300mm(Placed in parallel with sensor projecting/ 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.
	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

Title	Measuring Distance Type Obstacle Detection Sensor PBS-03JN Specifications	Drawing No.	C-42-3178	3/6

HOKUYO AUTOMATIC CO.,LTD.

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)

[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)

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

Title	Measuring Distance Type Obstacle Detection Sensor PBS-03JN　Specifications	Drawing No.	C-42-3178	4/6

HOKUYO AUTOMATIC CO.,LTD.

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)**
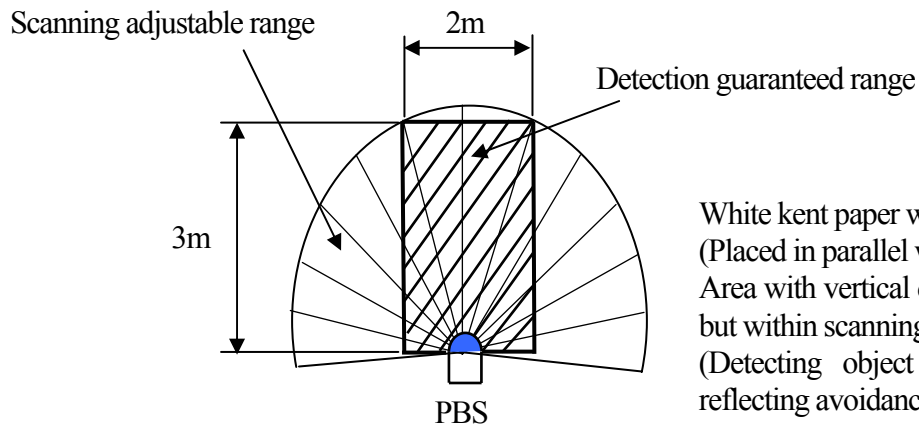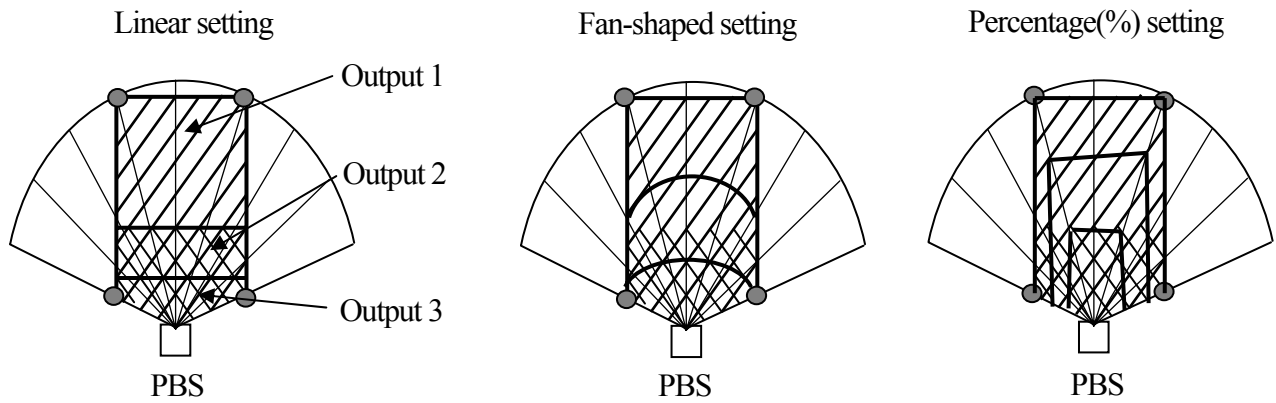
6. LED arrangement
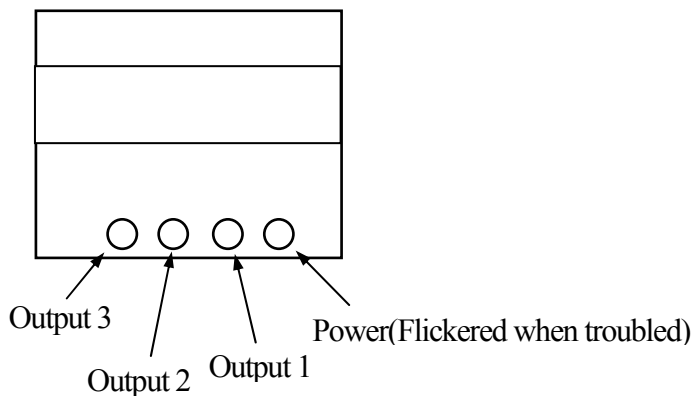
Output 3

Output 2   Output 1

Power(Flickered when troubled)

Title	Measuring Distance Type Obstacle Detection Sensor PBS-03JN Specifications	Drawing No.	C-42-3178	5/6

HOKUYO AUTOMATIC CO.,LTD.

7. Detecting guaranteed range and detecting area diagram

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

Linear setting

Output 1

Output 2

Output 3

PBS

Fan-shaped setting

PBS

Percentage(%) setting

PBS

Scanning adjustable range

2m

Detection guaranteed range

3m

PBS

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.

Title	Measuring Distance Type Obstacle Detection Sensor PBS-03JN Specifications	Drawing No.	C-42-3178	6/6

HOKUYO AUTOMATIC CO.,LTD.