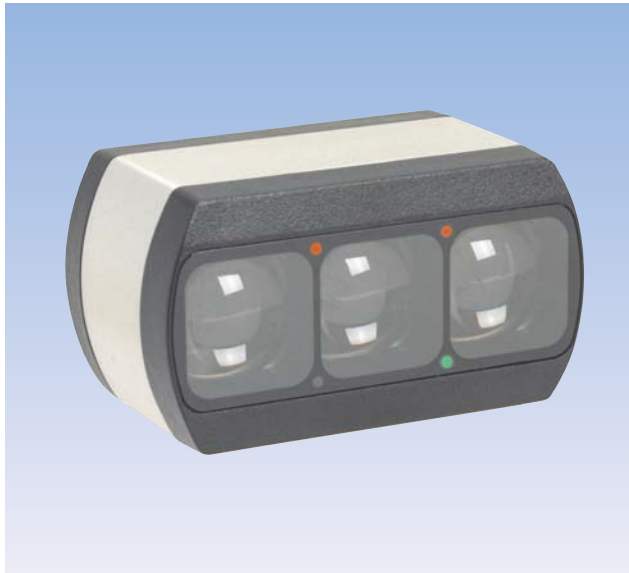


# DX-7 series

Phase difference distance detection



- Phase difference method employed
- Long detecting distance 7 m with direct reflection type
- Long detecting distance and high resolution simultaneously achieved  
Less influence of object color, etc.
- Applicable to wide variety of detecting situations by teaching  
Capable of point/zone sensing
- Anti Interference feature

Background suppression photo sensors

## Type

Type/detection method	Detecting distance	Model	Operation mode	Output mode
Diffuse-reflective phase difference detection	0.5~7.5m	<b>DX-7AH</b>	Output in proportion to distance	Analog output/ comparator output

## Optional parts

Type	Model	Shape
Special mounting bracket	<b>DX-B1</b>	H-shaped (for face mounting)
	<b>DX-B2</b>	L-shaped (for side mounting)

## Dimensions (in mm)

<ul style="list-style-type: none"> <li>● Prevention of collision of overhead traveling cranes and unmanned cranes</li> </ul>	<ul style="list-style-type: none"> <li>● Control of large winder</li> </ul>	<ul style="list-style-type: none"> <li>● Detection of level of grain or fine particle in tank</li> </ul>
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## Rating/Performance/Specification

Model	DX-7AH	
Detecting distance	0.5-7.5m (*1)	
Standard detecting object	700×700mm white drawing paper	
Power supply	12-24V DC ±10% / Ripple 10% max.	
Power consumption	2.3W max.	
Analog output	Current output	4-20mA±10% (allowable load resistance: 250 Ω max.)
	Resolution	±5%F.S. max. (*2)
	Linearity	10%F.S. max
	Response frequency	About 20Hz
Comparator output	Output mode	NPN open collector Sink current: 50 mA (30 VDC) max. / Residual voltage: 2 V or less
	Response frequency	About 20Hz
	Mode switching	Light-ON/Dark-ON selectable
	Load short circuit protection	Provided
Anti Interference	Provided Master/slave setting	
Light source (wavelength)	Infrared LED (870nm)	
Switch (SW)	Pushbutton switch×3	
Teaching method	Auto teaching (for comparator output only)	
Teaching mode	1-point normal teaching, 2-point normal teaching, 1-point zone teaching	
Material	case	Aluminum (alumite finish)
	Front/back panel	ABS resin
	Lens	Polycarbonate
	Lens front cover	Polycarbonate
Connection	6-pin waterproof plastic connector	
Mass	About 200 g	
Accessory	Cord with connector (*3), 250-Ω resistor for current-voltage conversion, operation manual	

\*1 Note that any object with high reflectance at a distance of 40-80 m may cause faulty operation.

The comparator output is designed for a distance of 0.5-7 m.

\*2 Output of higher resolution may be available by averaging or integration.

\*3 0.2 mm<sup>2</sup>×6 cores, 2 m (outer diameter: 5 mm)

## Environmental Specification

Model	DX-7AH
Ambient light	5000 lx max. (on light receiving surface)
Ambient temperature	-10 - +55 °C (non-freezing)
Ambient humidity	35-85%RH (non-condensing)
Protective structure	IP65
Vibration	10-55 Hz / 1.5 mm amplitude / 2 hours each in 3 directions
Shock	500 m/s <sup>2</sup> / 3 times each in 3 directions
Dielectric withstanding	1,000 VAC for 1 minute
Insulation resistance	500 VDC, 20 MΩ or higher

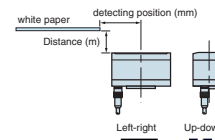
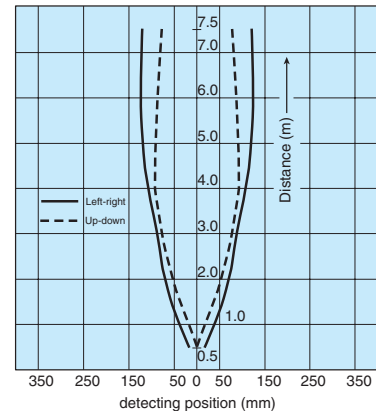


- Do not use the sensor for detection for protection of human body.
- For safety applications, ensure safe operation of the detection and control system as a whole.

## Characteristics (Typical Example)

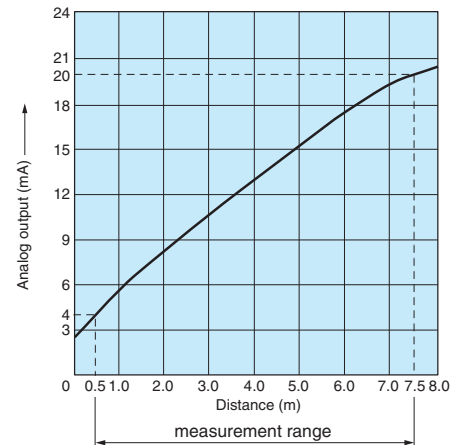
### Activation area characteristics

With no background



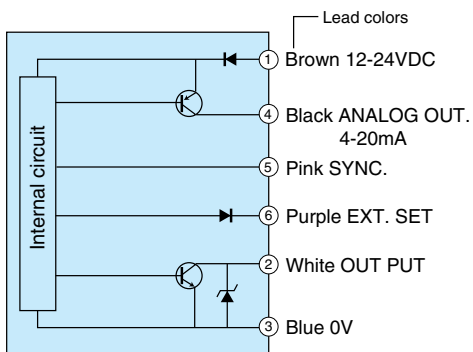
### Distance-output characteristics

Standard detecting object  
700×700mm white drawing paper



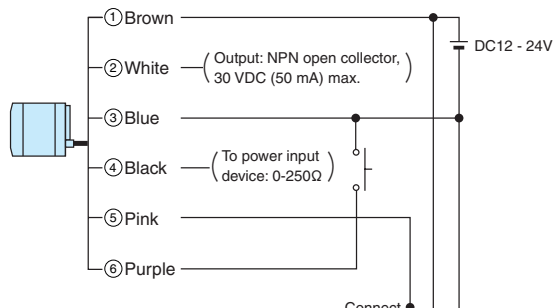
# DX-7

## Input/Output Circuit and Connection

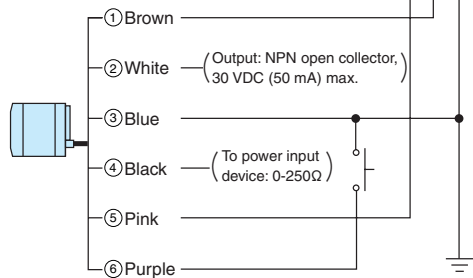


- When not using the EXT.SET line (purple), connect it with the power supply (+ V).
- For standalone use without enabling the Anti Interference, connect the (5) SYNC. line (pink) with the GND.

### Master sensor

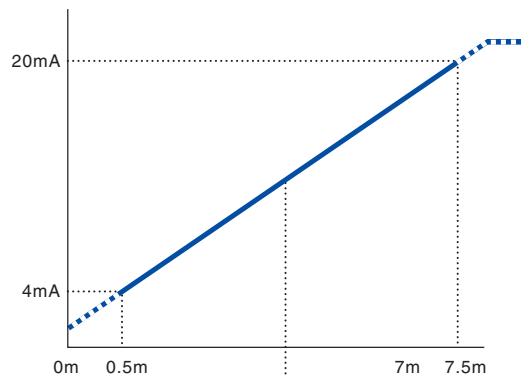


### Slave sensor



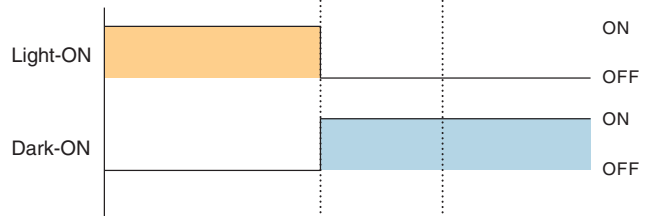
## Operation Chart

### Analog output



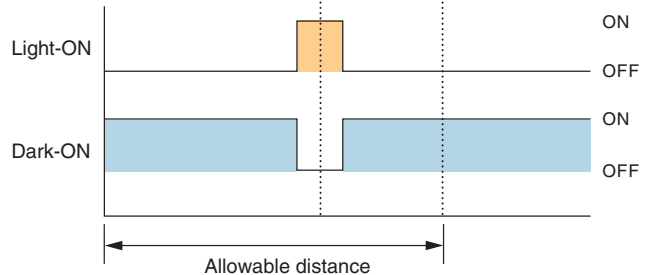
Current output of 4-20 mA available for detecting distance of 0.5-7.5 m.

### NOR mode setting



Sensor activated/deactivated at setting.

### 1-point ZONE mode setting



### Caution

If any background (wall, etc.) is present at a distance of 8-30 m from the sensor, a work that passes through the detecting range may cause:

- Output of a value for a closer point than the correct analog value on the edge of the work when the analog output is used.
- Transient activation on the edge of the work when the comparator output is used.

## Teaching Modes for Different Detecting Situations

Detecting situation	Detection of work at specific position	Detection by setting threshold between background and work	Detection of glossy work on this side of background by setting threshold only with background
Teaching	1-point normal teaching	2-point normal teaching	1-point zone teaching (may be performed externally)
Method	Teaching with work provided at intended point of detection	Teaching with background and work	Teaching with background (conveyor, ground, etc.)
Threshold	Threshold a1 set at position of teaching	Threshold a2 set midway between background and work	Thresholds a and b set at about $\pm 5\%$ with reference to distance to background
Operating range			

Background suppression photo sensors

## Outline of Teaching Procedure

- 1-point normal teaching/2-point normal teaching

Procedure	Operation	
	1-point normal teaching	2-point normal teaching
(1)	Provide the detecting object at the intended position.	Provide the detecting object
(2)	Press and hold down Button 2 until the RUN indicator (green) starts flashing (for about 3 seconds).	
(3)	Press Button 2 again with the object kept at the position (for about 0.5 seconds).	Move the detection object and press Button 2 (for about 0.5 second).

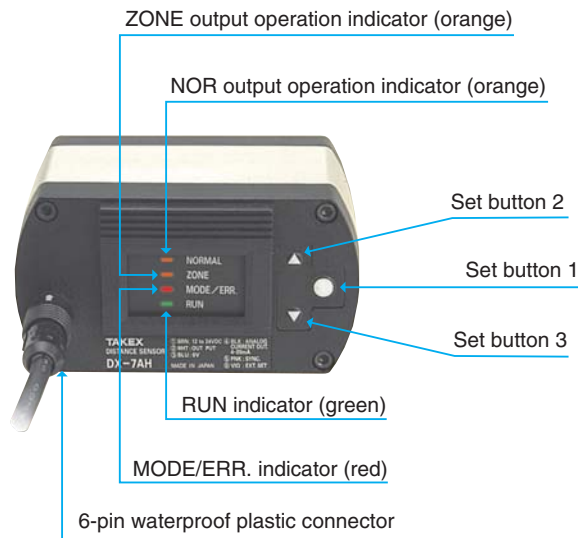
- 1-point zone teaching/external teaching

Procedure	Operation
(1)	Direct the detecting side of the sensor toward the background (conveyor, ground, etc.).
(2)	Press and hold down Button 3 (external switch for external teaching) until the RUN indicator (green) and MODE/ERR. indicator (red) start flashing alternately (for about 3 seconds).
(3)	Press Button 3 (external switch for external teaching) once again (for about 0.5 seconds).

- This type of teaching is used for teaching only with the background or detecting a glossy work on this side of the background.
- The glossy work is recognized as being on that side of the background for detection.

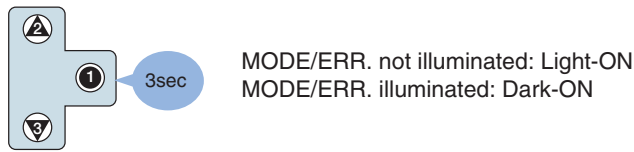
# DX-7

## Indicators and Set Buttons (Sensor Rear Panel)

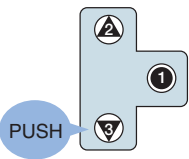


## Light-ON/Dark-ON Mode Setting

- (1) The MODE indicator (red) turns on and off every time the button is held down for about 3 seconds.

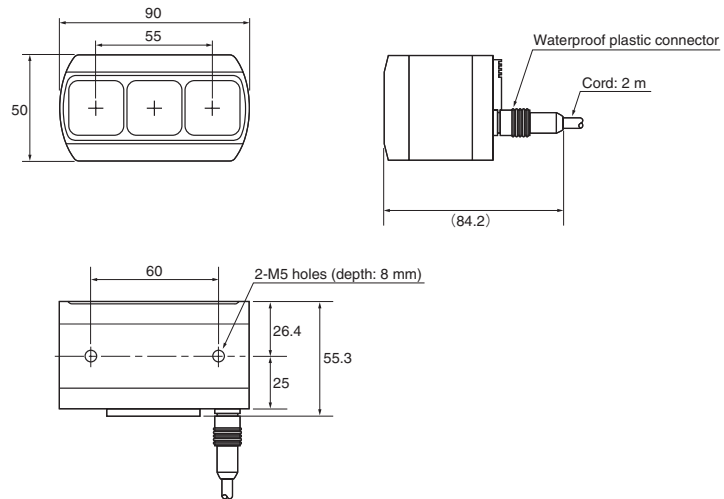


## Master/Slave Mode Setting

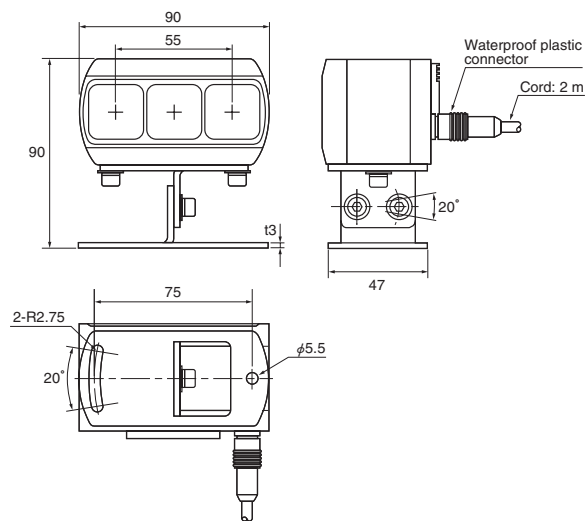
Procedure	Operation
(1)	Supply power while holding down Button 3. 
(2)	Release Button 3.
(3)	The slave mode has been enabled. Repeating the above steps alternates between the master and slave modes.  RUN illuminated: master mode RUN not illuminated: slave mode

## ■ Dimensions (in mm)

### Body



### With mounting bracket DX-B1 (optional) attached



### With mounting bracket DX-B2 (optional) attached

