

FE7W Series Photoelectric Sensors for Collision Prevention Sensing

FEATURES

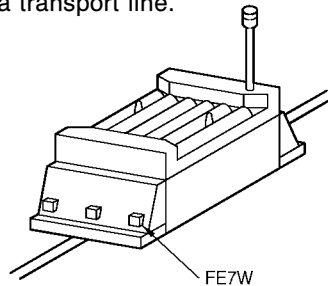
Collision of an Automatic Guided Vehicle (AGV) is Prevented in Advance. Obstacles Can be Sensed not in the Forward Direction of the AGV but also in the Left and Right-hand Directions to Reduce the Speed or Stop the AGV.

- The obstacle sensing range can be set to two modes. (slow, stop)
- Obstacles can be sensed not only in the forward direction of the AGV, but also in the left- and right-hand directions. **(FE7W-D□/5K)**
- Mutual interference between carts can be prevented since the signal emission frequency can be selected from 4 or 8 arcs.
- Wide or narrow detection width can be selected according to the AGV size. **(FE7W-D□/5K)**
- Sensors are compact and easy to adjust from the front.
- Obstacles can be detected from a long 3m range in the direction of travel. These sensors are applicable to even high speed AGVs.



APPLICATION EXAMPLES

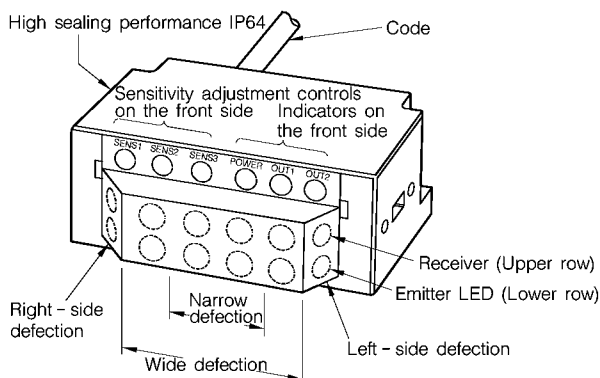
- Preventing the collision of AGVs.
- Sensing long-range position in a transport line.



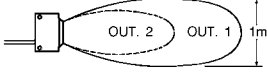
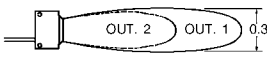
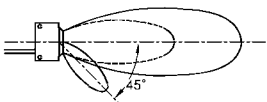
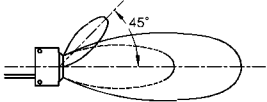
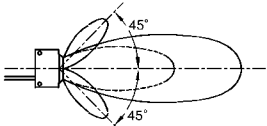
ORDER GUIDE

Detection method	Shape	Detection	Forward detection width	Operating mode	Output	Catalog listing
Diffuse scan		2 rows in forward direction and left & right sides (45 degrees)	1/0.3m selection	N.O. light operated	NPN Open collector	FE7W-DA5K
				N.C. dark operated	NPN Open collector	FE7W-DB5K
		2 rows in forward direction	0.3m fixed	N.O. light operated	NPN Open collector	FE7W-DA5
				N.C. dark operated	NPN Open collector	FE7W-DB5

EXTERNAL VIEWS



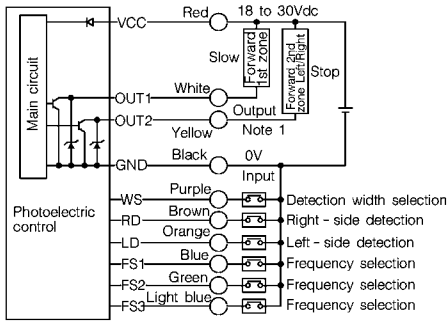
SPECIFICATIONS

Detection method		Diffuse scan															
Catalog listing		FE7W-DA5K				FE7W-DB5K				FE7W-DA5				FE7W-DB5			
Detection form		Forward (2 rows) and left & right sides (45 degrees)								Forward (2 rows)							
Scanning distance	Forward: 1st row	3m								3m							
	Forward: 2nd row	2.5m								2.5m							
	Left/right (45 degrees)	1m								—							
	Standard target object	50 × 50 90% reflecting paper															
Sensitivity adjustment	Forward: 1st row	SENS 1 control								SENS 1 control							
	Forward: 2nd row	SENS 2 control								SENS 2 control							
	Left/right (45 degrees)	SENS 3 control								—							
Detection width (1st row)	Horizontal direction	0.3/1.0m selectable by external input								0.3m fixed							
	Vertical direction	0.3m fixed								0.3m fixed							
Response speed		Operation, reset: Max. 80ms															
Differential travel		Max. 20%															
Light emitter		Infrared LED															
Supply voltage		18 to 30Vdc															
Current consumption		Max. 70mA															
Control output	OUT 1 (Slow)	Forward 1st zone output								Forward 1st zone output							
	OUT 2 (Stop)	Forward 2nd zone and left/right 45 degrees or connection output								Forward 2nd zone output							
	Operating mode	Light operated				Dark operated				Light operated				Dark operated			
	Output form	Open collector															
	Output switching current	Max. 100mA (resistive load) with output short-circuit protection circuit OUT 1, 2															
	Output saturation voltage	Max. 1V (when load = 100mA)															
Indication	OUT 1	Illuminates (at detection in the 1st zone)								Illuminates (at detection in the 1st zone)							
	OUT 2	Illuminates (at detection in the 2nd or left/right zone)								Illuminates (at detection in the 2nd zone)							
	POWER	Illuminates when power is supplied								Illuminates when power is supplied							
External control input	Input form		Contact or non-contact (low level input voltage: Max. 1.5V)														
	Detection width selection	Wide width	NPN: Open WS-GND														
		Narrow width	NPN: Close WS-GND														
	Right-side detection (Right LED only)		NPN: Close RD-GND														
	Left-side detection (Left LED only)		NPN: Close LD-GND														
	Right & left detection		NPN: Close RD-GND Close LD-GND														
	Signal emission frequency selection code table	Frequency No.		1	2	3	4	5	6	7	8	1	2	3	4		
NPN: FS1-GND		○	○	○	○	●	●	●	●	○	○	●	●				
NPN: FS2-GND		○	○	●	●	○	○	●	●	○	●	○	●				
NPN: FS3-GND		○	●	○	●	○	●	○	●	○	○	○	●				
		○: Open ●: Short															
Operating ambient light (receiver surface)		Incandescent lamp: Max. 3,000lux, solar light: Max. 10,000lux															
Operating temperature range		- 10 to +60°C															
Storage temperature range		-20 to +70°C															
Humidity range		45 to 85% RH															
Insulation resistance, dielectric strength		Min. 20MΩ (measured with 500Vdc megger), 500Vac 1 minute															
Vibration		Double amplitude 1.5mm, 10 to 55Hz, 2 hours along each of X, Y, Z axes															
Shock		490m/s ² 3 times along each of X, Y, Z axes															
Protection		IP64															
Housing		Polycarbonate															
Lead		Lead length: 2, 10m 9.0mm dia. in diameter 0.3mm ²															
Weight		Approx. 350g															

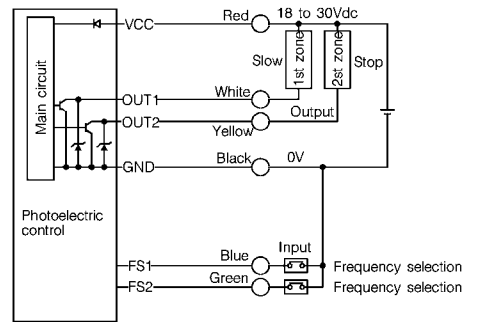
• Installation Instructions No.: CP-UM-3071E

WIRING DIAGRAM

FE7W-DA5K/DB5K



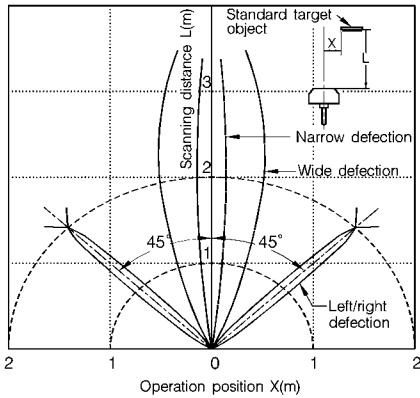
FE7W-DA5/DB5



CHARACTERISTICS

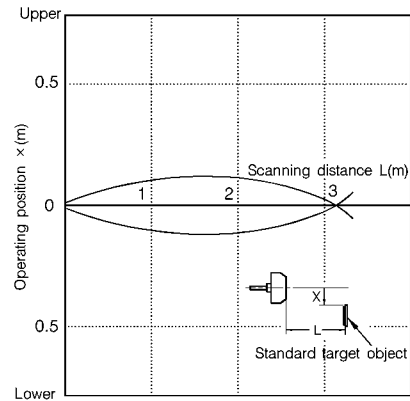
Detection area characteristics (Horizontal)

Forward (1st row) detection, left/right detection (Sensitivity adjustment control: Maximum)



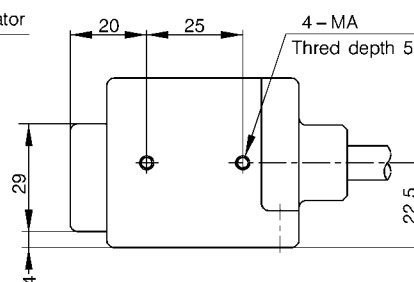
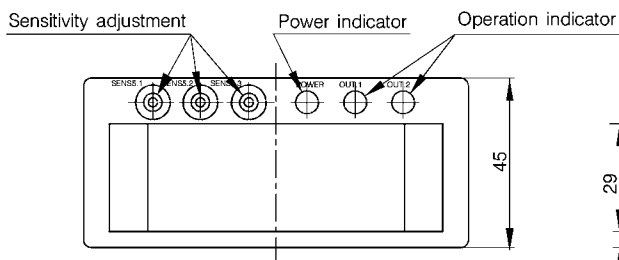
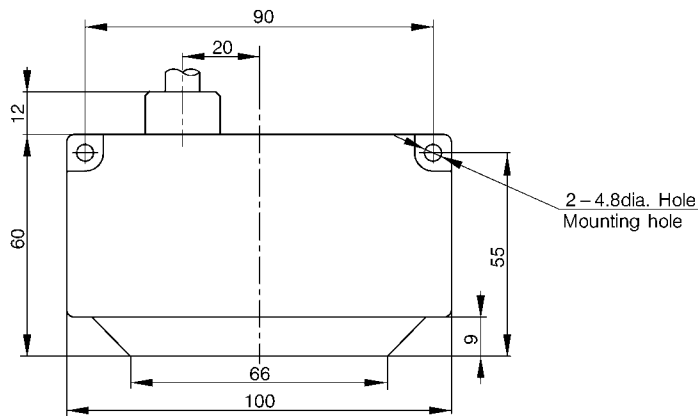
Detection area characteristics (Vertical)

Forward (1st row) detection (Wide/Narrow; Sensitivity adjustment control: Maximum)



EXTERNAL DIMENSIONS

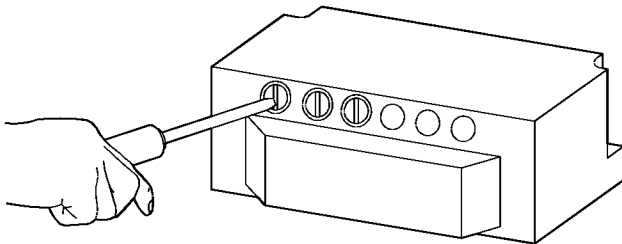
(unit: mm)



BASIC INSTRUCTIONS

● Basic instructions for sensitivity adjustment

- The scanning distance and the detection area of a diffuse scan model depend on the size, material, and reflectance of the target object.
- To adjust the sensitivity, when a target object is present, raise the sensitivity adjustment gradually from minimum and set it where the operating indicator illuminates or where the output toggles.
- After adjusting the sensitivity, remove the target object and make sure that the indicator goes out without being influence from the background or nearby objects. Check this over the entire motion range of the photoelectric sensor.
- If the background or other nearby objects influence the sensor's sensitivity, reduce the scanning distance or remove the object. Since a white wall exerts a large influence, select dark backgrounds if possible.
- Since the sensitivity is adjusted on the front side, make sure your hand is not detected during the above adjustments.



Do not influence the deflection surface with your hand.

- The sensitivity of the 1st row and the 2nd rows (forward sensing) can be adjusted independently using SENS 1 and SENS 2. You are advised to set the 1st row (which has a long scanning distance) first. After making sure that the background and nearby objects are not exerting any influence, adjust the 2nd row.
- Only one sensor is provided for adjusting the sensitivity of right-side and left-side detection. The two sides cannot to adjusted independently.
- If you are not using left-right-side detection, set SENS 3 to the minimum.

● Wiring instructions

- Connect photoelectric sensors, power units and loads correctly.
- Do not put photoelectric sensor leads in the same conduit tube as high voltage or power cables. Surges and noise can cause destruction or incorrect operation.
- Connect the ends of leads securely using a crimp terminal.
- Use a cable of at least 0.3mm². The lead should not be longer than 100m. Consider the influence of noise due to lead extension.
- If a generic controlling regulator is used, ground its frame.

● Mounting instructions

- Since this is a long-range diffuse scan photoelectric sensor, take into consideration the reflectance of the background and nearby objects. Pay special attention to reflection from the reflector of a nearby coaxial diffuse scan photoelectric sensor.
- When a number of photoelectric sensors of this series must be used in the same space, set their frequencies by referring to the frequency selection code table, in order to prevent incorrect operation due to mutual interference.
- Unstable operation may be caused by the signal of another photoelectric sensor. Therefore, carefully study the layout of all controls.



RESTRICTIONS ON USE

This product has been designed, developed and manufactured for general-purpose application in machinery and equipment. Accordingly, when used in applications outlined below, special care should be taken to implement a fail-safe and/or redundant design concept as well as a periodic maintenance program.

- Safety devices for plant worker protection
- Start/stop control devices for transportation and material handling machines
- Aeronautical/aerospace machines
- Control devices for nuclear reactors

Never use this product in applications where human safety may be put at risk.

Specifications are subject to change without notice.

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