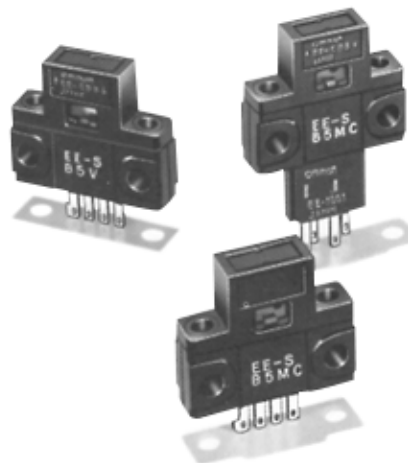



EE-SB5M/SB5MC/SB5V/SB5VC/SB5V-E

Photomicrosensor with 80-mA
Switching Capacity that can be Built
into Equipment

- Built-in amplifier
- Models available with 5- to 12-VDC and 5- to 15-VDC input
- CMOS- and TTL-compatible
- Model with easy adjustment with an external sensitivity adjuster (EE-SB5V)
- Special connectors (EE-1001/1006)
- 19-mm sensing distance (EE-SB5V-E)
- Convert to PNP output with EE-2002 conversion connector



Ordering Information

Appearance	Sensing method	Sensing distance	Output configuration	Weight	Part Number
	Reflective	5 mm	Light-ON	Approx. 3.0 g	EE-SB5M
			Dark-ON		EE-SB5MC
			Light-ON		EE-SB5V
			Dark-ON		EE-SB5VC
		19 mm	Light-ON	Approx. 2.8 g	EE-SB5V-E

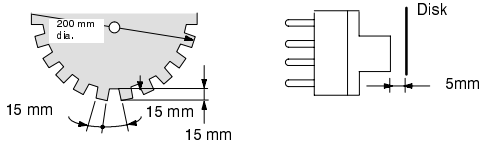
Specifications

■ RATINGS

Item	Reflective				
	EE-SB5M	EE-SB5MC	EE-SB5V(-E)	EE-SB5VC	
Supply voltage	5 to 12 VDC ±10%, ripple (p-p): 10% max.		5 to 15 VDC ±10%, ripple (p-p): 10% max.		
Current consumption	36 mA max.		48 mA max. (DC current: $I_F = 25$ mA)		
Maximum forward direct current (I_F)	—		30 mA max.		
Forward voltage (V_F)	—		1.5 V max. ($I_F = 30$ mA)		
Reverse voltage (V_R)	—		4 V max.		
Standard reference object	White paper with reflection factor of 90% (standard sensing object: 15 x 15 mm)				
Differential distance	0.1 mm				
Control output	At 5 to 24 VDC: 80-mA load current (I_C) with a residual voltage of 0.8 V max. When driving TTL: 40-mA load current (I_C) with a residual voltage of 0.4 V max.				
Output configuration	Transistor on output stage without detecting object	OFF	ON	OFF	ON
	Transistor on output stage with detecting object	ON	OFF	ON	OFF

Item	Reflective			
	EE-SB5M	EE-SB5MC	EE-SB5V(-E)	EE-SB5VC
Response frequency*	50 Hz			
Connecting method	EE-1001/1006 Connectors; soldering terminals			
Light source	GaAs infrared LED with a peak wavelength of 940 nm			
Receiver	Si photo-transistor with a sensing wavelength of 850 nm max.			

*The response frequency was measured by detecting the following disks rotating.



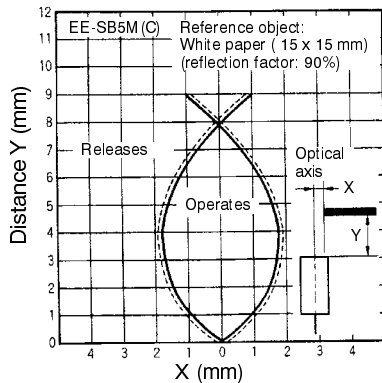
CHARACTERISTICS

Ambient temperature	Operating	-25° to 55°C
	Storage	-30° to 80°C
Ambient humidity	Operating	45% to 85%
	Storage	35% to 95%
Vibration resistance	Destruction	20 to 2,000 Hz (with a peak acceleration of 20G's), 1.5-mm double amplitude for 4 min each in X, Y, and Z directions
Shock resistance	Destruction	500 m/s ² for 3 times each in X, Y, and Z directions
Soldering heat resistance	260±5°C (see note) when the portion between the tip of the terminals and the position 1.5 mm from the terminal base is dipped into the solder for 10±1 seconds	

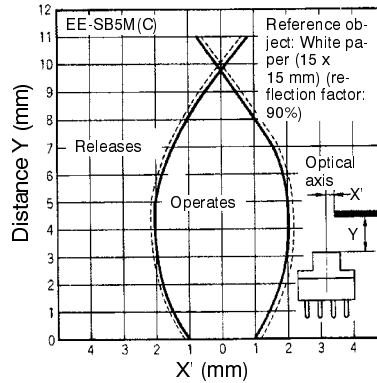
Note: This conforms to MIL-STD-750-2031-1.

Engineering Data

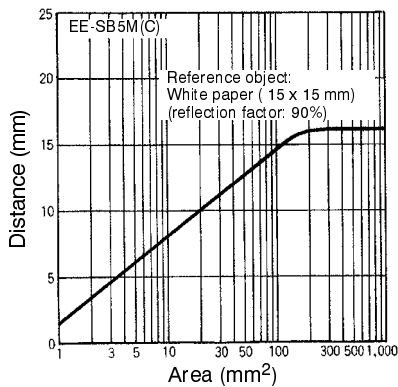
OPERATING RANGE (TYPICAL 1)



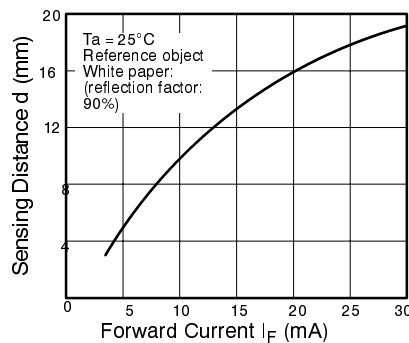
OPERATING RANGE (TYPICAL 2)



SENSING DISTANCE VS. OBJECT AREA (TYPICAL)



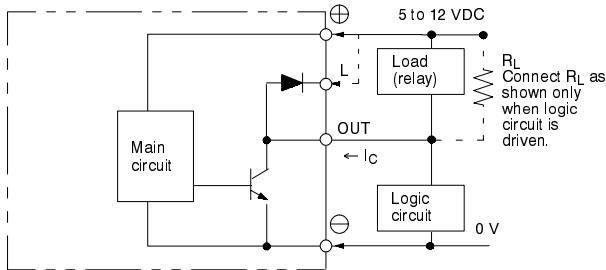
SENSING DISTANCE VS. I_F EE-SB5V-E (TYPICAL)



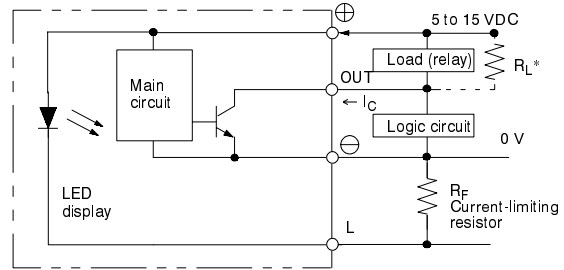
Operation

INTERNAL/EXTERNAL CIRCUIT DIAGRAMS

EE-SB5M(C) Light-ON/Dark-ON

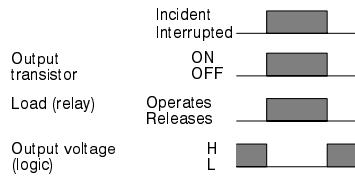


EE-SB5V(C), EE-SB5V-E Light-ON/Dark-ON

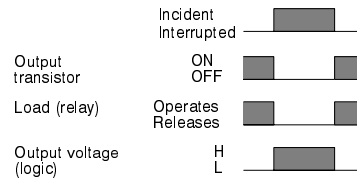


TIMING CHART

Light-ON



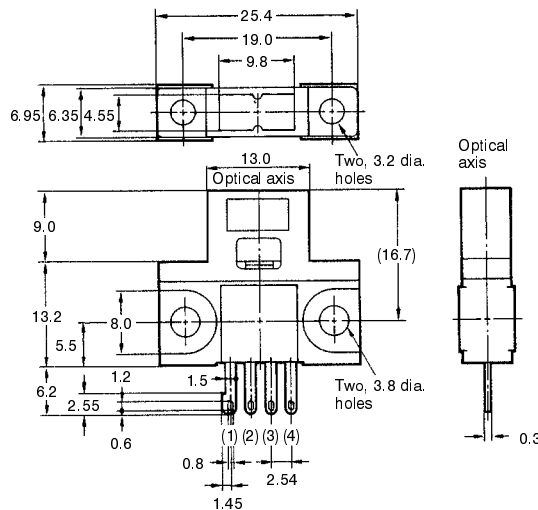
Dark-ON



Dimensions

Unit: mm

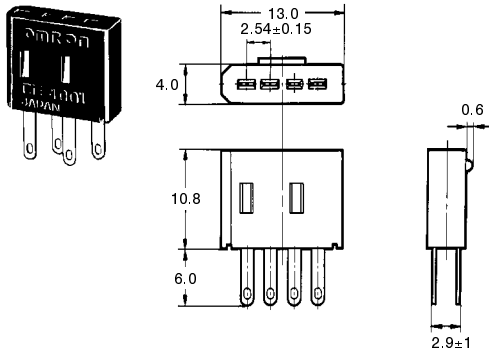
EE-SB5M(C), EE-SB5V(C), EE-SB5V-E



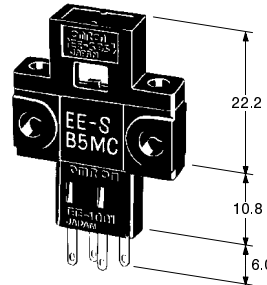
Terminal Arrangement

(1)	⊕	V _{CC}
(2)	L	L
(3)	OUT	OUTPUT
(4)	⊖	GND (0 V)

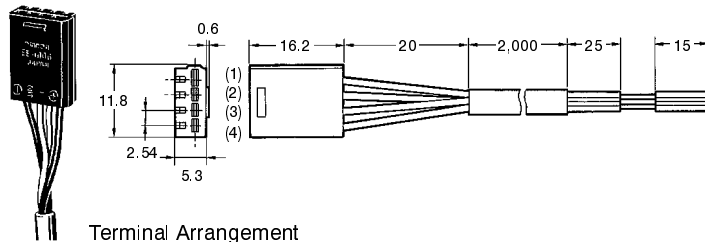
■ EE-1001 CONNECTOR



■ EE-SB5M(C)/SB5V(C)/SB5V-E + EE-1001



■ EE-1006 CONNECTOR WITH CABLE

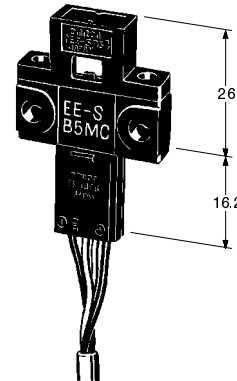


Terminal Arrangement

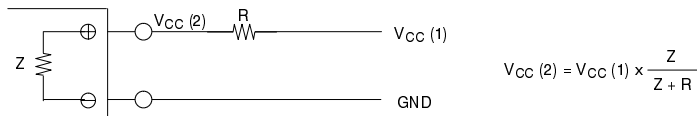
(1)	Red (Brown)	⊕	VCC
(2)	Yellow (Pink)	L	L
(3)	White (Black)	OUT	OUTPUT
(4)	Black (Blue)	⊖	GND (0 V)

Note: IEC colors are shown in parentheses.

■ EE-SB5M(C)/SB5V(C)/SB5V-E + EE-1006



Note: Supply 5 to 12 V to the EE-SB5M(C). Wire as shown by the following diagram if the supply voltage exceeds 12 V.



Note: Z is the internal impedance between the positive and negative terminals.

Model	V _{CC} (2)	Z (Ω)
EE-SB5M(C)	5 to 12 V	360

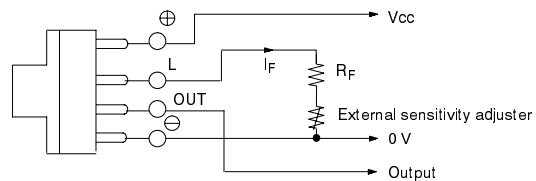
Precautions

Refer to the Technical Information Section for general precautions.

An external sensitivity adjuster can be connected to the EE-SB5V(C), EE-SB5V-E Photomicrosensor. When connecting the sensitivity adjuster, insert resistor R_F (current-limiting resistor) as shown by the diagram. The value of R_F is obtainable as follows:

$$R_F > (V_{CC} - 1.5 V) / 30 \text{ mA}$$

Note: The EE-SB5V(C) and EE-SB5V-E have no constant current circuit to protect the LED. Therefore, the LED will be damaged by excessive current applied to the positive terminal. To prevent potential LED damage, connect a current-limiting resistor as shown previously.



NOTE: DIMENSIONS SHOWN ARE IN MILLIMETERS. To convert millimeters to inches divide by 25.4.

OMRON[®]
OMRON ELECTRONICS, INC.
One East Commerce Drive
Schaumburg, IL 60173
1-800-55-OMRON

OMRON CANADA, INC.
885 Milner Avenue
Scarborough, Ontario M1B 5V8
416-286-6465