

(Note 2): For coaxial reflective fibers, insert the center fiber (single-core) into the emitting part. Be careful that reverse installation will lead to deterioration of sensing accuracy.


## 2 Repair and Maintenance

### 2-1 Troubleshooting

#### Troubleshooting

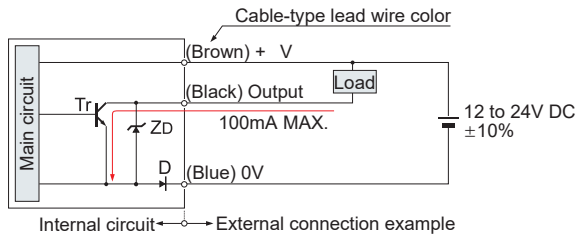
Fault	Causes	Measures
Blank on screen	State of power off or disconnection.	Check the wiring, power supply voltage and power supply capacity.
Nothing shows on the digital display	Power saving function is ON.	Turn off the Eco function.
Setting unknown	—	Perform setting initialization.

#### Error display

Error name/display	Causes	Measures
	Current overload of control output	Confirm the load of control output and set it within the rating. Check whether the load is short-circuited.

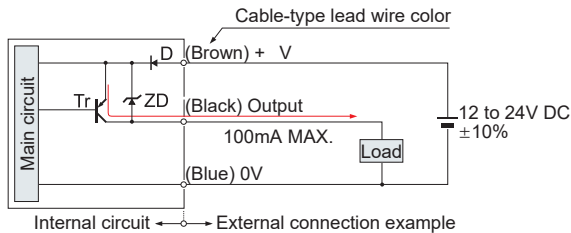
### 2-2 I/O segment circuit diagram

#### · NPN I/O ,circuit diagram



Symbol... Tr : NPN output transistor  
ZD : Zener diode for surge voltage absorption  
D : Diode for power/output reverse-connection protection

#### · PNP I/O ,circuit diagram



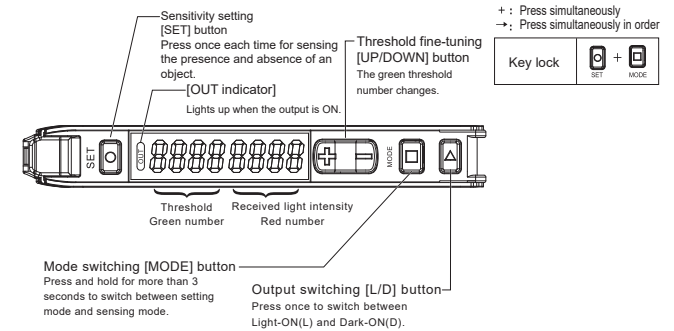
Symbol... Tr : PNP output transistor  
ZD : Zener diode for surge voltage absorption  
D : Diode for power/output reverse-connection protection

### 2-3 Ratings/Specifications


Item	Type	Wire lead-out type
	Model	
	NPN output	E-MSMFA11-2M
	PNP output	E-MSMFA41-2M
Light source	Red modulated light 620nm	
Operating Voltage	12 to 24V DC±10% with ripple (p-p) 10% or less	
Power/Current consumption	≤30mA	
Output mode	NPN open collector/PNP open collector	
Switch mode	L.on (Light-ON)/D.on (Dark-ON) can be set	
Response time	Standard Mode 200μs, Long Distance Mode 24ms, High Speed Mode 25μs	
Timer function	On Delay, Off Delay, ONE SHOT timer	
Timing Range	1 to 9999ms	
Practical features	Parameter initialization/key lock/threshold two-point, auto and manual setting	
Advanced features	Reference value tracking, adjustable illuminating frequency, offset setting, area sensing	
Ambient temperature	-20°C to 55°C	
Ambient humidity	35 to 85%RH	
Ambient luminosity	Incandescent lamp: ≤20,000Lx max, Sunlight ≤30,000Lx max	
Protection circuit	Surge protection circuit, short circuit protection, reverse polarity protection	
Shock resistance	500m/s <sup>2</sup> , 2 hours each in X, Y and Z directions	
Vibration resistance	10 to 55Hz, full amplitude 1.5mm, 2 hours each in X, Y and Z directions	
Material	PC	

## 3 Setting

### 3-1 List of Operations and Displays

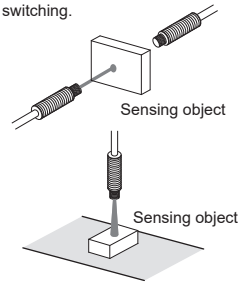


### 3-2 Output Switching Method

1. Press the  button once for Light-ON(L)/Dark-ON(D) switching.

Thru-beam type : When there is a sensing object, set to "Dark-ON" if you want the product to enter the ON state.


Reflective type : When there is a sensing object, set to "Light-ON" if you want the product to enter the ON state.




### 3-3 Smart Adjustment [Simple Sensitivity Adjustment]

#### ① When a sensing object can be set

##### ● 2-point teaching

1. Press the  button when there is a sensing object.



2. Press the  button again when there is no sensing object.






➡ Settings completed

[ 2000000000 ] will be displayed when stable sensing is possible, while [ 2000000000 ] will be displayed when stable sensing is impossible.

Threshold setting: Set to the middle value of received light intensity in steps 1 and 2.  
Note: The order of steps 1 and 2 can be reversed.

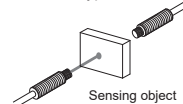
## ② When no sensing object can be set

### ● Limit-teaching

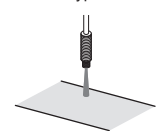
1. Press the  button when there is a sensing object or there is no sensing object.
2. Press the  button again to adjust to a higher reference value (low sensitivity), or press the  button to adjust to a lower reference value (high sensitivity).

Note 1: The offset with initial value of 10% can be displayed as a percentage [approx. 0~999% (in 1% increments)] or a value [approx. 0~9999 (in 1 increments)]. For the setting method of offset, refer to <5. Offset Setting> in "5. Detailed Settings".

Thru-beam type: Presence of sensing object



Reflective type: Absence of sensing object






➡ Settings completed

[LtcH9000] will be displayed when stable sensing is possible, while [LtcHRRrd] will be displayed when stable sensing is impossible.

## ③ When sensing object cannot be stopped

### ● Auto-teaching

1. When there is no sensing object, press the  button once, and the green number is displayed as [LtcH].
2. While passing through the sensing object, press the  button again, and after the green number is displayed as [AutoL], keep pressing the button for more than 3 seconds, and then release the  button.




➡ Settings completed

Received light intensity setting: Adjust the maximum received light intensity in step 1 to the light intensity adjustment level.

Threshold setting: Set to the middle value of the maximum received light intensity and the minimum received light intensity in step 1.

[Auto 9000] will be displayed when stable sensing is possible, while [AutoRRrd] will be displayed when stable sensing is impossible.

## 3-4 Threshold Fine-Tuning

1.  Press the button for setting.



Note: High-speed adjustment can be made by pressing the button continuously.



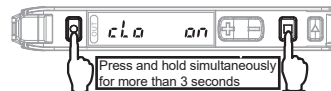


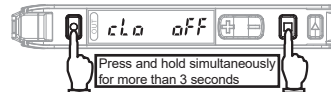
## 4 Convenient setting

### ① To prevent mis-operation.

#### ● Key lock


Disable the operation of all buttons. [cLa on] is displayed when the button is pressed.

#### ■ Execute/Cancel (same procedure)

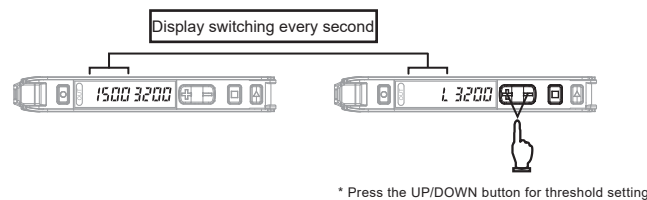
1. Execute key lock by  and pressing the  button at the same time. 
2. Unlock by  and pressing the  button at the same time. 

### ② To perform sensing within a certain range

#### ● Area sensing

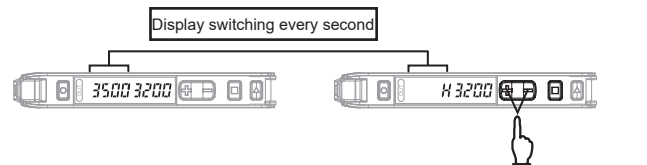
1. Turn on the "Area Mode" function in the setting mode, and then exit the setting mode.
2. Press the  button to switch the setting between the lower threshold [L] and upper threshold [H].

#### ■ Setting of the lower threshold [L]



\* Press the UP/DOWN button for threshold setting

#### ■ Setting of the upper threshold [H]



\* Press the UP/DOWN button for threshold setting

Note: 1. The minimum difference between the setting values L and H should be  $\geq 200$ .  
2. When the Area Mode is turned on, "3-3. Smart Adjustment" and <11. Reference Value Tracking> in the function settings will be turned off.

## CAUTION

- Be sure to carry out wiring when the power supply is turned OFF.
- Verify that the supply voltage variation is within the rating.
- If the power is supplied from a commercial switching regulator, make sure that the ground terminal of power supply frame (F.G) is grounded.
- In case noise generating equipment (switching regulator, inverter motor, etc.) is used in the vicinity of this sensor, connect the ground (F.G) terminal of the equipment to an actual ground.
- Do not use during the initial transient time (0.5 s) after the power supply is switched on.
- Do not directly connect capacitors or capacitive loads as the self-diagnostic output is not equipped with short-circuit protection.
- Do not run the wires together with high-voltage lines or power lines or put them in the same raceway. This can cause malfunction due to induction.
- Cable with a cross-sectional area of 0.3mm<sup>2</sup> or less can be extended up to 100m.
- Do not use this product in places having dust, dirt or vapor.
- Take care that the sensor does not come in direct contact with water, oil, grease, or organic solvents, such as thinner.

## Letter of Commitment on Product Quality

MiSUMi products have undergone strict factory inspection. In case of any fault, contact MiSUMi technical staff and provide details of the fault so that we can solve it for you as soon as possible.

### Warranty period

- The warranty period is one year from the date on which the product is delivered to the location specified by the Buyer.

### Warranty scope


- (1) If there is a fault caused by MISUMI within the above warranty period, MISUMI will repair the product free of charge.  
However, the following situations are not covered by the warranty.
  - Faults caused by incorrect use or improper operation due to failure to comply with the conditions specified in the instruction manual, user manual or technical requirements specifically reached between the Buyer and MISUMI.
  - Faults caused not by defects in the product but the Buyer's equipment or software design.
  - Faults due to modifications or repairs by personnel not from MISUMI.
  - Faults that could be completely avoided by correct maintenance or replacement of wearing parts in accordance with the operating instruction or user manual.
  - Faults caused by factors such as unforeseen changes in the level of science and technology after the product is shipped from MISUMI.
  - MISUMI is not responsible for any fault due to natural disasters such as fire, earthquake and flood, or external factors such as abnormal voltage.
- (2) The warranty scope is limited to the conditions stipulated in Article (1), and MISUMI shall not be liable for any indirect loss (equipment damage, loss of opportunity, loss of profit, etc.) or other losses caused to the Buyer by its equipment.

### Applicability of the product

MiSUMi products are designed and manufactured for general-purpose products in general industries, thusly MISUMi products cannot be used in and are not suitable for the following applications. However, the product can be used if the Buyer consults MISUMi in advance on the use of the product in a responsible manner, understands the technical specifications, grades and performance of the product, and takes necessary safety measures. In this case, the product warranty coverage is the same as above.

- Applications where there is potential chemical pollution or electrical damage, or use under conditions and environments not specified in the product catalog, instruction manual, etc.
- Atomic force control equipment, incineration equipment, railways, aircrafts, vehicle equipment, safety devices and equipment manufactured for administrative agencies and in accordance with the regulations of individual industries.
- Machinery, systems and devices that may endanger life and property.
- Equipment requiring high reliability such as gas, water & electricity supply systems, and 24-hour continuous operation systems.

## 5 Detailed Settings

Press the  button for more than 3 seconds to switch to the Setting Mode.

The function migration displays the factory settings.

Note: In the Setting Mode, press the  button for more than 3 seconds under any menu to exit the Setting Mode.

