

**生産終了
DISCONTINUED**

OMRON

Model **E3G-L1** □, **L3** □

INSTRUCTION SHEET

Thank you for selecting OMRON product. This sheet primarily describes precautions required in installing and operating the product.

Before operating the product, read the sheet thoroughly to acquire sufficient knowledge of the product. For your convenience, keep the sheet at your disposal.

TRACEABILITY INFORMATION:
 Representative in EU:
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 The Netherlands

Manufacturer:
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 Kyoto 600-8530 JAPAN
 Ayabe Factory
 3-2 Narutani, Nakayama-cho,
 Ayabe-shi, Kyoto 623-0105 JAPAN

The following notice applies only to products that carry the CE mark:
 Notice:
 This is a class A product. In residential areas it may cause radio interference, in which case the user may be required to take adequate measures to reduce interference.

* 5 9 7 7 2 3 9 - 7 C *

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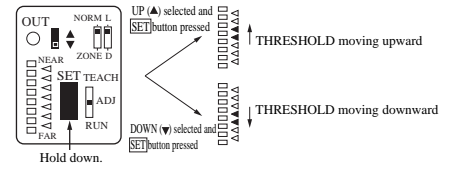
RAITINGS/PERFORMANCE

Item	Type	E3G-L11	E3G-L12	E3G-L15	E3G-L16	E3G-L31	E3G-L32	E3G-L35	E3G-L36
Connection		Cord type			Connector type			Cord type	
Light source		Red LED (670nm)			Infrared LED (860nm)				
Supply voltage		10 to 30 V DC (including 10% ripple (P-P))							
Current consumption		55mA max				65mA max			
Detectable range		5 to 50mm (50×50mm white paper, 50mm distance)				5 to 200mm (50×50mm white paper, 200mm distance) 5 to 150mm (50×50mm black paper, 150mm distance)			
Pre-settable distance		30 to 50mm (50×50mm white paper, black paper)				50 to 200mm (50×50mm white paper) 50 to 150mm (50×50mm black paper)			
Response time		Run/reset: Shorter than 1.5ms each				Run/reset: Shorter than 2.5ms each			
Projection spot diameter		1mm max (at detection distance of 38mm)				15mm max (at detection distance of 150mm)			
Hysteresis		4% max of setting distance				10% (typical) of setting distance			
Reflectivity characteristics (black/white error)		±4% of setting distance				±10% of setting distance (at detection distance of 50 to 150mm)			
Control output		Load supply voltage 30V DC max Load current 100mA max							
Control output switching		L-ON/D-ON switching							
Protective circuit		Reverse-phase connection protection, Load short-circuit protection, Mutual interference prevention							
Indicator		Operation indicator (orange), Incident light level indicator (green, 8 levels), Threshold indicator (red, NORMAL mode in 13 levels and ZONE mode 5 levels)							
Ambient temperature		Operation: -25 to +55°C, storage: -30 to +70°C (no freezing and condensation)							
Ambient humidity		Operation: 35 to 85%RH, storage: 35 to 95%RH (no condensation)							
Protective design		IEC60529 IP67 (with protective cover)							
Material		Casing: polybutylene, Lens: acrylic resin (PMMA), Fixture: stainless steel (SUS304)							
Weight		About 64g (2m cord included)		About 21g		About 64g (2m cord included)		About 21g	

ADJUSTMENT PROCEDURE

After teaching, the threshold can be finely adjusted. If detection is unstable by difference of color, adjust threshold to make detection stable.

- Set the MODE selector to the **ADJ** position.
- In the ADJ mode, specify the adjustment direction with the UP/DOWN selector. Each time the **SET** button is pressed, the threshold moves up or down. Up to 13 levels can be preset (at Normal one-point, two-point teaching and Zone one-point teaching).



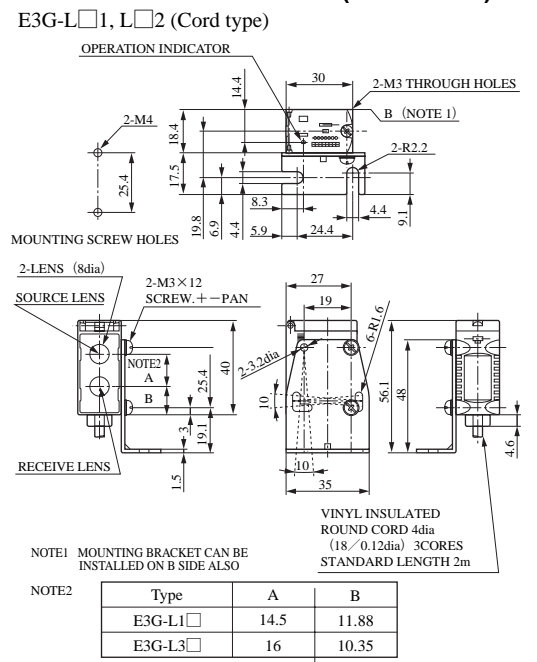
THRESHOLD indicator light-up in adjusting the sensitivity Up to 13 levels are adjustable for the normal teaching. (Up to 5 levels are adjustable for the zone teaching.)

- Finally set the MODE selector to the RUN position.

THRESHOLD and DISTANCE indicator light-up

- Light-up in the case of distance setting in normal teaching. The DISTANCE indicators tell the distances that are re-lative to the thresholds. Using the UP/DOWN selector and the SET button, the threshold can be shifted. The distance differential is fixed, however.
- Light-up in the case of distance setting in zone teaching. The DISTANCE indicators tell the current distance range that is relative to the threshold. Using the UP/DOWN selector and the SET button, the output ON range can be shifted. The distance differential is fixed, however.

EXTERNAL DIMENSIONS (with Fixture)



PRECAUTIONS FOR SAFE USE

Be sure to follow the safety precautions below for added safety.

- Do not use the sensor under the environment with explosive or ignition gas.
- Never disassemble, repair nor tamper with the product.
- Keep the supply voltage within the specified range.
- Do not use the sensor over the rated values.
- Do not short-circuit the load. The sensor type has a load short-circuit protective function, but avoid keeping it short-circuited for a long time.
- Do not use the sensor in the water.
- Be careful not to confuse the terminal polarities.

PRECAUTIONS FOR CORRECT USE

- Do not use the product under the following conditions.
 - In the place exposed to the direct sunlight.
 - In the place where humidity is high and condensation may occur.
 - In the place where corrosive gas exists.
 - In the place where vibration or shock is directly transmitted to the product.

- Connections
 - Before turning on the power, make sure the supply voltage is below the maximum voltage level.
 - Routing the wires of the photoelectric switch with high potential power lines may cause malfunction or damage to it because of the inductive effects. Be sure to route the switch wires separated from the power lines or through an exclusive conduit.
 - For extending wires, use a cable of 0.3mm² min. and 100m max. in length.

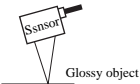
- Cleaning
Do not use thinner such as alcohol and benzene because it may damage a product.
- Power supply
When using a commercially available switching regulator, be sure to ground the FG (Frame Ground) and G (Ground) terminals. If this is not done, failure in operation may happen by switching noise of the regulator.
- Function of this sensor will be stable 100ms after turning on the power supply.
- Water-proof
Do not use in the water, rain or outdoor.
- Control cover
Tighten the cover screws at the torque of 0.2 to 0.3 N·m to keep water-proof.

Installation

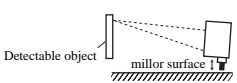
- Position the photoelectric switch so that direct sunlight, fluorescent light, incandescent light and any other strong rays do not come within the response angle.
- Sensors that are installed facing each other may cause mutual interference. Set them up with their optical axes not facing each other.
- Use 3M screws to secure the unit.
- Tighten the casing screws to 0.54 N·m or lower.
- M8 connectors
 - Before connecting and disconnecting the connectors, be sure to turn off the power.
 - In connecting and disconnecting the connectors, be sure to hold the connector covers.
- Setup direction
 - Be sure to place the photoelectric switch so that its sensing face be parallel with (not tilted against) a detectable object.



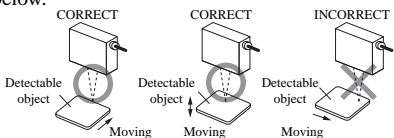
- When detecting a glossy object, however, place the photoelectric switch tilted 5-10° to the glossy object. See the figure below or select Zone one-point teaching.



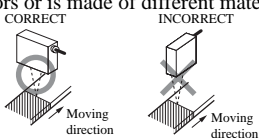
- If there is something mirror-surfaced below the photo-electric switch, the switch performance may be adversely affected. Tilt the switch or keep it away enough from the mirror surface.



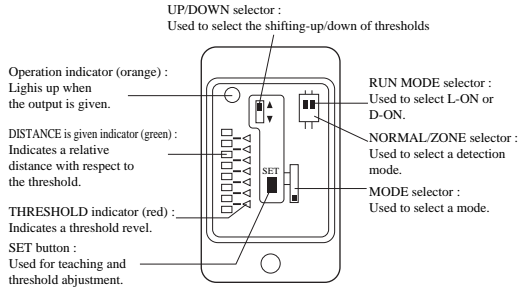
In placing the photoelectric switch, pay attention to the moving direction of a detectable object. See the figure below.



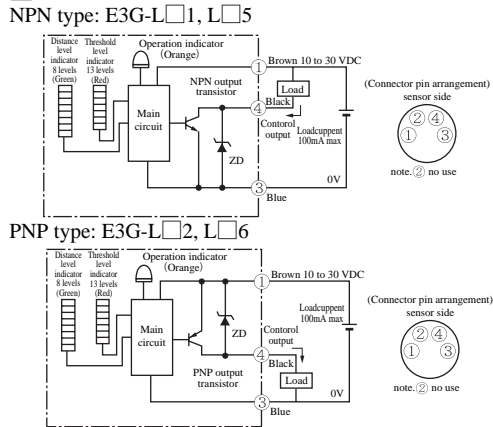
Be also careful when a detectable object has quite different colors or is made of different materials.



NAMES AND FUNCTIONS OF PARTS



OUTPUT STAGE CIRCUIT DIAGRAM



OPERATING PROCEDURE

- Make sure that the sensor is installed and the wires are connected as specified. Turn on the power.
- Set (teach) the distance level. See "Distance setting".
- Finely adjust the threshold as required. See "Adjustment procedure".
- Make sure that the MODE selector is at the RUN position.

DISTANCE SETTING APPLICATION

	When distinction between objects is desired	Making setting without work. (Background only)	Detecting a glossy work and normal work front of background.
Application	Applications • Minute difference detection • Detection of height difference	Applications • Detection of objects above a conveyor. • Detection of objects a front of background.	Applications • various glossy objects
Teaching	Normal two-point teaching	Normal one-point teaching	Zone one-point teaching
Detecting range and setting distance			
Teaching point:	① under position ② upper position Setting distance: center of ① to ②	① background Setting distance: just front of ①	Teaching point: ① background Setting distance: (A) and (B)

It is available to adjust operation level after teaching. (refer to adjustment procedure)

Note 1: Background distance.

Type	X
E3G-L1	32
E3G-L3	55

Note 2: In case the setting distance is more than 150mm, the maximum detecting distance depend on color of the object. Before using, make sure if it works. (Type E3G-L3)

The following settings can also be made. To set the sensor's distance differential to the maximum distance, see "Maximum distance setting". To set it to the minimum distance, see "Minimum distance setting".

DISTANCE SETTING (TEACHING)

Set the Mode Selector to **TEACH**. Set the selector to **RUN** to complete the distance setting.

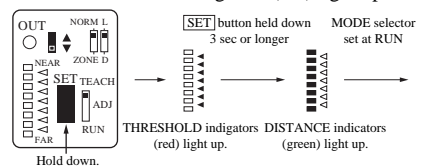
- Zone one-point teaching**
 - Set the NORMAL/ZONE selector to the **ZONE** position.
 - Direct the sensor toward the background and hold down the **SET** button. All the THRESHOLD indicators (red) light up. Then release the SET button.
 - When the teaching is acceptable, all the DISTANCE indicators (green) light up.
 - If the teaching is rejectable, all the THRESHOLD indicators (red) start flashing. Re-arrange the sensor. Repeat steps 2 to 3 again.
- Set the MODE selector to the **RUN** position.
- Using the RUN MODE selector, select L-ON or D-ON. L-ON: Output is given by the background. D-ON: Output is interrupted by the background.

Normal one-point teaching

- Set the NORMAL/ZONE selector to the **NORMAL** position.
- Direct the sensor toward the background and hold down the **SET** button.
 - All the THRESHOLD indicators (red) light up.
 - If the teaching is rejectable, all the THRESHOLD indicators (red) start flashing.
- Set the MODE selector to the **RUN** position.
- Using the RUN MODE selector, select L-ON or D-ON. L-ON: Output is given between the background and the sensor. D-ON: Output is interrupted between the background and the sensor.

Minimum distance setting

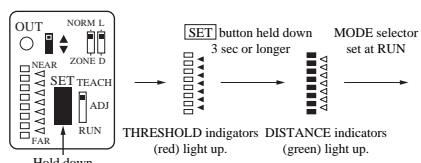
- To set the sensor's distance differential to the minimum distance, take the following steps.
- Set the NORMAL/ZONE selector to the **NORMAL** position.
 - Set the UP/DOWN selector to the DOWN (▼) position.
 - Hold down the **SET** button for 3 seconds or longer.
 - All the THRESHOLD indicators (red) light up.



- Wait until all the DISTANCE indicators (green) light up. Set the MODE selector to the **RUN** position.
- Using the RUN MODE selector, select L-ON or D-ON. (Refer back to the normal one-point teaching.)

Maximum distance setting

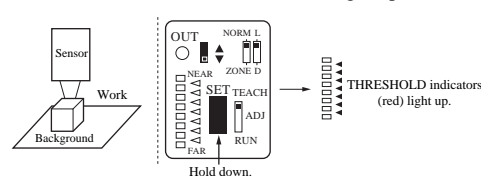
- To set the sensor's distance to the maximum distance, take the following steps.
- Set the NORMAL/ZONE selector to the **NORMAL** position.
 - Set the UP/DOWN selector to the UP (▲) position.
 - Hold down the **SET** button for 3 seconds or longer.
 - All the THRESHOLD indicators (red) light up.



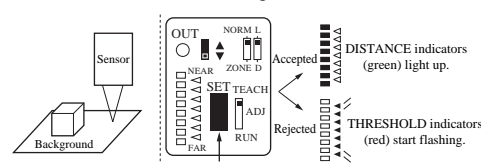
- Wait until all the DISTANCE indicators (green) light up. Set the MODE selector to the **RUN** position.
- Using the RUN MODE selector, select L-ON or D-ON. (Refer back to the normal one-point teaching.)

Normal two-point teaching

- Set the NORMAL/ZONE selector to the **NORMAL** position.
- Direct the sensor toward a work and hold down the **SET** button.
 - All the THRESHOLD indicators (red) light up.

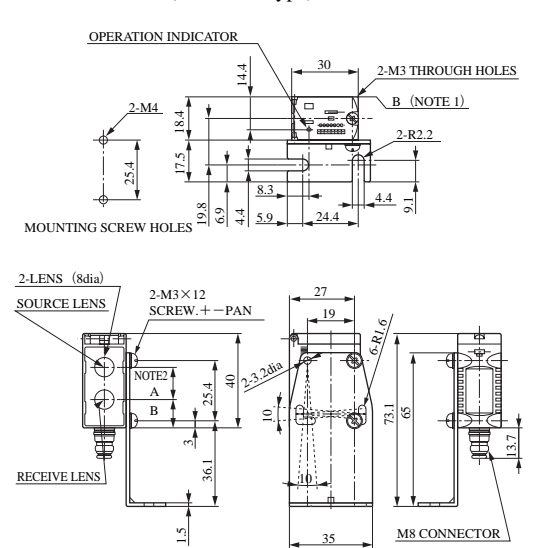


- Move the work. Direct the sensor toward the background and hold down the **SET** button.
 - When the teaching is acceptable, all the DISTANCE indicators (green) light up.
 - If the teaching is rejectable, all the THRESHOLD indicators (red) start flashing.



- When the teaching is accepted, set the MODE selector to the **RUN** position. If it is rejected, change the work position and distance. Repeat the above steps 3 and 4.
- Using the RUN MODE selector, select L-ON or D-ON. Note: EEPROM write error correction. If during teaching the power is cut off or static electricity causes noises, there may be a write error (the RUN indicator starts flashing). In such case, do the teaching again.

E3G-L5, L6 (Connector type)



Suitability for Use

THE PRODUCTS CONTAINED IN THIS SHEET ARE NOT SAFETY RATED. THEY ARE NOT DESIGNED OR RATED FOR ENSURING SAFETY OF PERSONS, AND SHOULD NOT BE RELIED UPON AS A SAFETY COMPONENT OR PROTECTIVE DEVICE FOR SUCH PURPOSES. Please refer to separate catalogs for OMRON's safety rated products.

OMRON shall not be responsible for conformity with any standards, codes, or regulations that apply to the combination of the products in the customer's application or use of the product.

Take all necessary steps to determine the suitability of the product for the systems, machines, and equipment with which it will be used. Know and observe all prohibitions of use applicable to this product.

NEVER USE THE PRODUCTS FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCT IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM. See also Product catalog for Warranty and Limitation of Liability.

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OMRON Corporation
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形 E3G-L1□、L3□

距離設定形光電センサ

取扱説明書

このたびは、本製品をお買い上げいただきまして、まことにありがとうございます。ご使用に際しては、次の内容をお守りください。

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■定格 / 性能

Table with specifications for E3G-L11, L12, L15, L16, L31, L32, L35, L36. Includes columns for model, connection method, light source, power, and detection range.

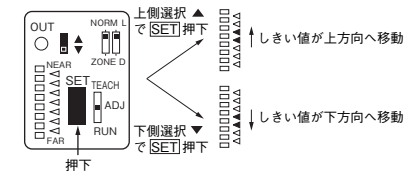
4. ティーチングOKの時、設定完了です。モード切換SWを[RUN]に設定します。
5. 動作モード切換SWでL - ON/D - ONを設定します。

注:EEP - ROM書き込みエラーの対処

ティーチング時の電源遮断や静電気などのノイズにより書き込みエラー(動作表示灯の点滅)が発生した場合、ティーチングを再度行ってください。

■調整手順

ティーチング後に、しきい値の微調整を行うことができます。色の違いにより不安定な場合はしきい値を上下させて安定な検出を確認してお使いください。



ノーマルティーチングのとき、最大13段階調整可能
ゾーンティーチングのとき、5段階調整可能

●しきい値と距離レベル表示方法

ノーマル1点、2点ティーチングにより距離設定した場合の表示距離レベル表示灯で距離レベルを表示します。距離レベル表示灯は、しきい値に対する相対的な距離を示します。

■外形寸法図(取り付け金具装着時)

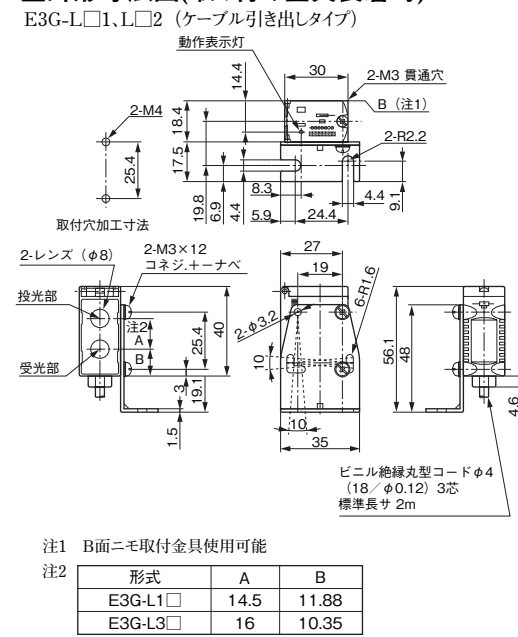
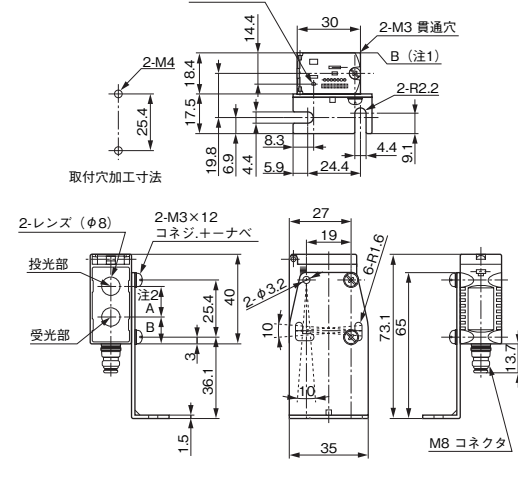


Table with 3 columns: Form, A, B. Rows for E3G-L1□, E3G-L3□.



ご使用に際してのご承諾事項

- ① 安全を確認する目的で直接的または間接的に人体を検出する用途に、本製品を使用しないでください。
② 下記用途に使用される場合、当社営業担当者までご相談のうえ仕様書などによりご確認いただくとともに、定格・性能に対し余裕を持った使い方、万一故障があっても危険を最小にする安全回路などの安全対策を講じてください。

オムロン株式会社 インダリアルオートメーションビジネスカンパニー
お問い合わせ先
0120-919-066
055-982-5015 (通話料がかかります)

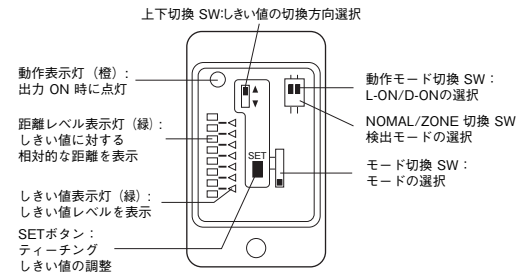
安全上の要点

- 以下に示すような項目は、安全を確保する上で必要なことですので必ず守ってください。
(1) 引火性、爆発性ガスの環境では使用しないでください。
(2) この製品は、分解したり、修理、改造をしないでください。

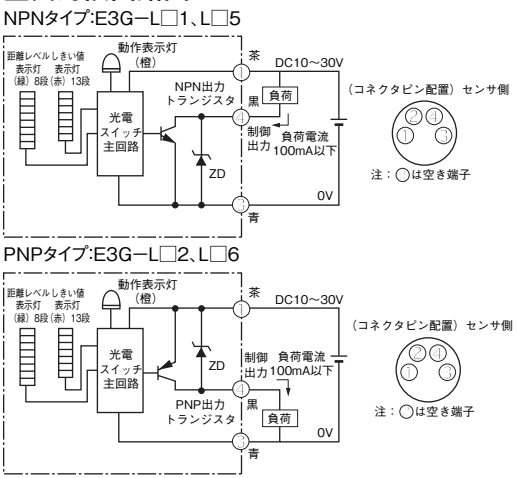
使用上の注意

- ご使用に関して
(1) 下記の設置場所では使用しないでください。
① 直射日光があたる場所
② 湿度が高く、結露する恐れのある場所
③ 腐食性ガスのある場所

■各部の名称、機能



■出力回路図



■操作手順

- 1. センサの取り付け、配線を行い電源を投入してください。
2. 距離設定(ティーチング)を行ってください。→「距離設定」参照
3. 必要に応じて、しきい値の微調整を行ってください。

■距離設定の選び方

Table for selecting distance setting based on application. Columns include application type (e.g., small gap, no work), detection method (normal 2-point, 1-point, zone), and detection range.

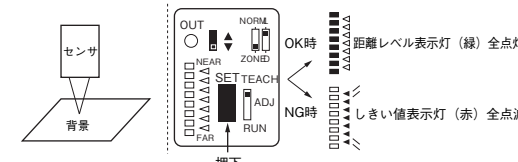
実際にライン上で動作レベル(距離)の微調をしたい場合は(しきい値)設定距離を調整することができます。

Table with 2 columns: Form, X. Rows for E3G-L1□ (32) and E3G-L3□ (55).

その他、以下の設定も可能です。
センサの最大距離に設定したい→最大距離設定
センサの最小応差に設定したい→最小距離設定

■距離設定(ティーチング)

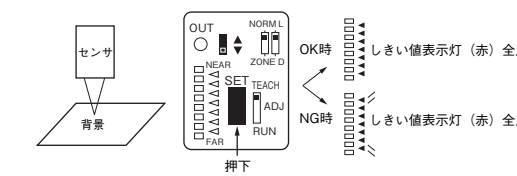
- モード切換スイッチを[TEACH]側にセットして設定を行った後、[RUN]側にセットしてご使用ください。
●ゾーン1点ティーチング(ワークなしティーチング)
1. NORMAL/ZONE切換SWを[ZONE]に設定します。
2. 背景で[SET]ボタンを押します。押下時しきい値表示灯(赤)が全点灯します。



- 3. モード切換SWを[RUN]に設定します。
4. 動作モード切換SWでL - ON/D - ONを設定します。
L - ON:背景で出力ONします。
D - ON:背景で出力OFFします。

●ノーマル1点ティーチング(ワークなしティーチング)

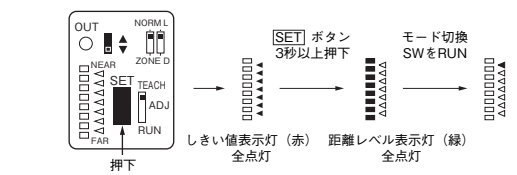
- 1. NORMAL/ZONE切換SWを[NORMAL]に設定します。
2. 背景で[SET]ボタンを押します。
しきい値表示灯(赤)が全点灯します。
ティーチングNGの場合、しきい値表示灯(赤)が全点滅します。再度設定距離を変更し、2. から再設定してください。



- 3. モード切換SWを[RUN]に設定します。
4. 動作モード切換SWでL - ON/D - ONを設定します。
L - ON:背景—センサ間で出力ONします。
D - ON:背景—センサ間で出力OFFします。

●最小距離設定

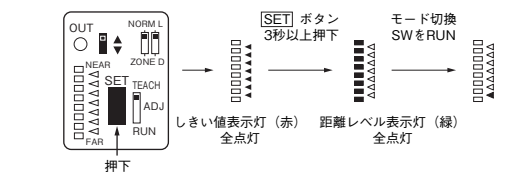
- センサの応差の距離を最小距離に設定したい場合、以下の手順で最小距離設定を行います。
1. NORMAL/ZONE切換SWを[NORMAL]に設定します。
2. 上下切換SWを下側「▼」に設定します。
3. [SET]ボタンを3秒以上押します。
しきい値表示灯(赤)が全点灯します。



- 4. つづけて距離レベル表示灯が全点灯したら、設定完了です。モード切換SWを[RUN]に設定します。
5. 動作モード切換SWでL - ON/D - ONを設定します。(ノーマル1点ティーチング参照)

●最大距離設定

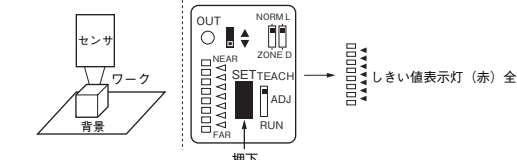
- センサを最大距離に設定したい場合、以下の手順で最大距離設定を行います。
1. NORMAL/ZONE切換SWを[NORMAL]に設定します。
2. 上下切換SWを上側「▲」に設定します。
3. [SET]ボタンを3秒以上押します。
しきい値表示灯(赤)が全点灯します。



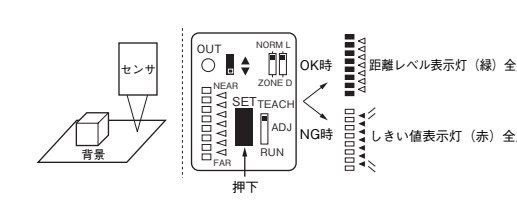
- 4. 距離レベル表示灯(緑)が全点灯したら、設定完了です。モード切換SWをRUNに設定します。ティーチングNG時1.から再設定ください。
5. 動作モード切換SWでL - ON / D - ONを設定します。(ノーマル1点ティーチング参照)

●ノーマル2点ティーチング(ワークありティーチング)

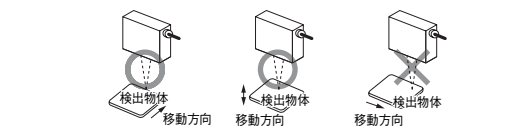
- 1. NORMAL/ZONE切換SWを[NORMAL]に設定します。
2. ワークで、[SET]ボタンを押します。
しきい値表示灯(赤)が全点灯します。



- 3. ワークを移動させ、背景上で[SET]ボタンを押します。
ティーチングOK時、距離レベル表示灯(緑)が全点灯します。
ティーチングNG時、しきい値表示灯(赤)が全点滅します。



光電スイッチの取り付け方向については検出物体の移動方向に注意して下記のように取りつけてください。



また、検出物体の色・材質が極端に変化する場合も下記のように取りつけてください。

