

ZXD-B CMOS LASER DISPLACEMENT SENSOR



INSTRUCTION SHEET

Thank you for selecting INNO for your requirement.

This sheet describes the procedure and precautions required for installing and operating the product.

Kindly read this sheet before operating or installing the product. Store the sheet for future reference.

CAUTION FOR SAFETY

- ⓘ Please keep this sheet for review before use of unit.
- ⓘ Please observe the following:

⚠ WARNING
Serious injury may occur if instructions are not followed

⚠ CAUTION
Product failure or injury can occur if instructions are not followed

⚠ WARNING

- This is not a safety product and is not to be used with machinery that requires use of safety control.
- Do not disassemble or modify this unit. It may lead to electric shock/fire.

Do not connect sensor to AC power supply.
RISK OF EXPLOSION!

⚠ CAUTION

- This unit shall not be used outdoors.
- Do not use the unit in places where there is flammable or explosive gas.
- Please observe the rated specifications in Instruction Sheet.
- Do not use this unit beyond rated power and do not supply AC power at DC power type.
- Please check the polarity of power and wrong wiring.
- Do not use this unit in places where there is vibration or impact.
- Do not use water or oil based detergent for cleaning the unit.
- Do not use excessive force to tighten the unit and do not hammer the unit.
- Please process it as industrial waste and dispose responsibly.

SPECIFICATIONS

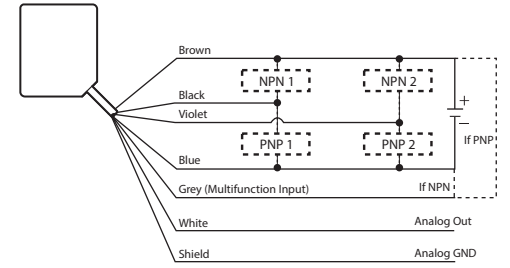
*For details on Customized/ Special Models contact Seller

| *Models | 2 NPN | ZXD-B-30N2- _ | ZXD-B-50N2- _ | ZXD-B-85N2- _ | ZXD-B-120N2- _ |
|---------------------------|---|---|----------------|----------------|-----------------|
| | 2 PNP | ZXD-B-30P2- _ | ZXD-B-50P2- _ | ZXD-B-85P2- _ | ZXD-B-120P2- _ |
| | NPN + Current | ZXD-B-30N2C- _ | ZXD-B-50N2C- _ | ZXD-B-85N2C- _ | ZXD-B-120N2C- _ |
| | PNP + Current | ZXD-B-30P2C- _ | ZXD-B-50P2C- _ | ZXD-B-85P2C- _ | ZXD-B-120P2C- _ |
| | NPN + Voltage | ZXD-B-30N2V- _ | ZXD-B-50N2V- _ | ZXD-B-85N2V- _ | ZXD-B-120N2V- _ |
| | PNP + Voltage | ZXD-B-30P2V- _ | ZXD-B-50P2V- _ | ZXD-B-85P2V- _ | ZXD-B-120P2V- _ |
| Sensing Distance | 30mm | 50mm | 85mm | 120mm | |
| Measurement Range | ±4mm | ± 10mm | ± 20mm | ± 60mm | |
| Full Scale | 8mm | 20mm | 40mm | 120mm | |
| Light Source | Class II Red Laser Diode (wavelength 650nm) | | | | |
| Spot Size | Near | 0.15 x 0.15mm | 0.6 x 1.2mm | 0.9 x 1.5mm | 1.2 x 1.8mm |
| | Middle | 0.1 x 0.1mm | 0.5 x 1.0mm | 0.75 x 1.25mm | 1.0 x 1.5mm |
| | Far | 0.15 x 0.15mm | 0.4 x 0.9mm | 0.6 x 1.0mm | 0.5 x 0.8mm |
| Linearity | ± 0.1% F.S. | | | | |
| Temperature Drift | ± 0.08% F.S./ °C | | | | |
| Response Time | 500 μs | | | | |
| Resolution | Fast Mode | 4μm | 8μm | 15μm | 45μm |
| | Other Modes | 2μm | 5μm | 10μm | 30μm |
| Response Time | Fast | 1ms+ selecting sensitivity (averaging: 1) | | | |
| | Standard | 8.5ms+ selecting sensitivity (averaging: 16) | | | |
| | High Resolution | 32.5ms+ selecting sensitivity (averaging: 64) | | | |
| | Selecting Sensitivity | max. 4ms | | | |
| Supply Voltage | 12 - 24 VDC (Ripple Max 10%); Voltage Output Models: 18-24 VDC (-5%, +10%) | | | | |
| Current Consumption | Control Output: max. 75mA (24 VDC); Analog Output: max. 80mA (24 VDC) | | | | |
| Control Output | NO, NC - NPN or PNP open collector output (depending on model) | | | | |
| Control Output Rating | Load Voltage: max. 30 VDC; Load Current: max 100mA (residual voltage max. 1.8V) | | | | |
| Analog Output | 4-20mA; 0-10 V | | | | |
| Operation Indications | Distance Indication: Bargraph LED; Output Indication: Orange (ON) | | | | |
| Shock Resistance | 50 G; Vibration: 10-55Hz at 1.5mm, 2 hrs for X, Y, Z axes | | | | |
| Environmental Illuminance | Sunlight: max. 10,000 lux, Lamp: msx. 3,000 lux | | | | |
| Ambient Temperature | Operation: -10° ~ 45°C; Storage: -20° ~ 60°C (non- freezing; non- condensing) | | | | |
| Ambient Humidity | Operation: 35 ~ 85% RH; Storage: 35 ~ 95% RH (non- condensing) | | | | |
| Protection Class | IP67 | | | | |
| Weight | Cable Type: approx. 65g (without cable); Connector Type: approx. 70g | | | | |
| Material | Housing: PBT, Lens: PMMA or Eqv. | | | | |

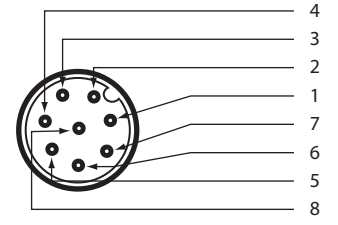
NOTE: Models nos. are abbreviated at the last. "- _" signifies, availability of both 2meter cable and M12 connector type models.

CONNECTION DIAGRAM

◆ Cable Type

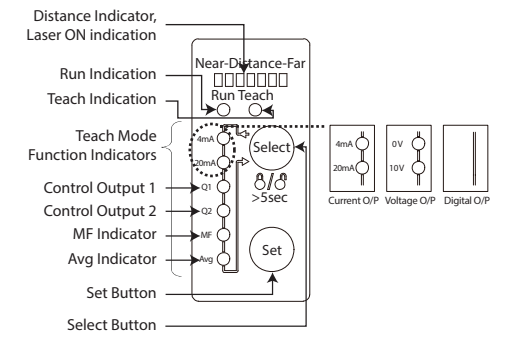


◆ Connector Type



- Brown (1) : DC 10~30V
- White (2) : 0V
- Blue (3) : Control Output
- Black (4) : Memory Bank Remote Selector
- Grey (5) : Memory Bank Remote Selector
- (6) : Memory Bank Remote Selector
- Violet (7) : No Connection
- (8) : No Connection

NOMENCLATURE



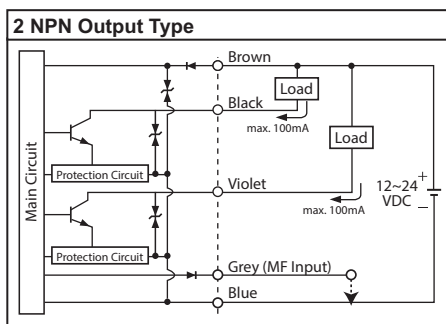
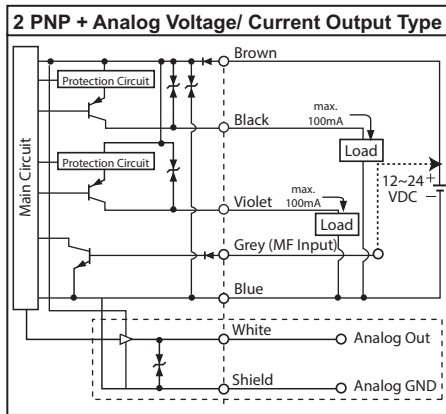
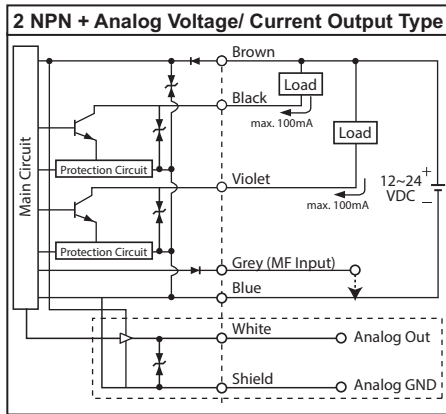
Represented by:

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S-2, Guindy Industrial Estate
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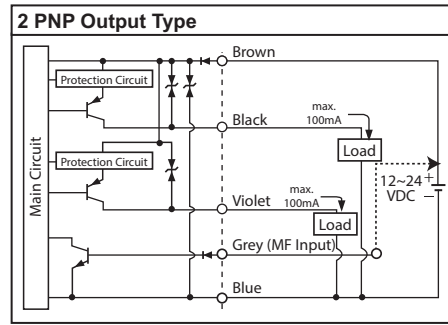


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CONTROL OUTPUT DIAGRAM

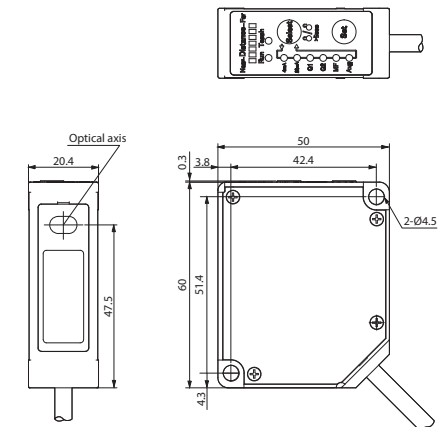


CONTROL OUTPUT DIAGRAM

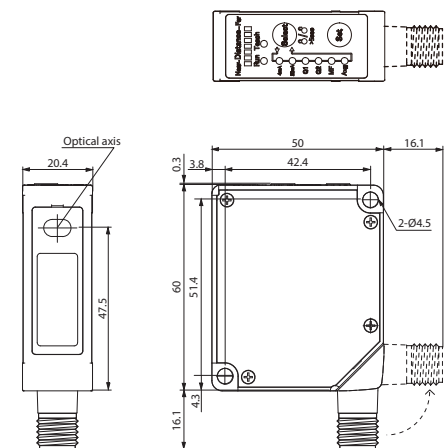


DIMENSIONS

◆ Cable Type



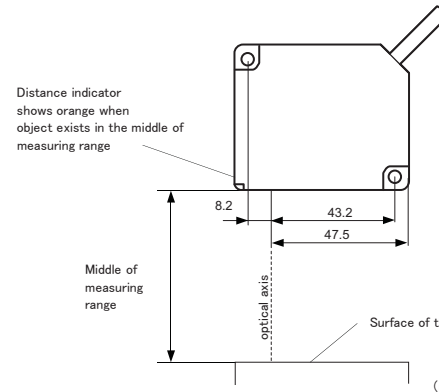
◆ M12 Connector Type



MOUNTING AND ADJUSTMENTS

• Installation

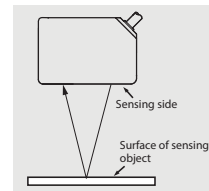
Install the sensor and adjust the light spot onto the measuring point so that the distance indicator turns ON (Orange) at the middle of the measuring range.
Use M4 Screw, max. tightening torque needs to be under 0.8Nm



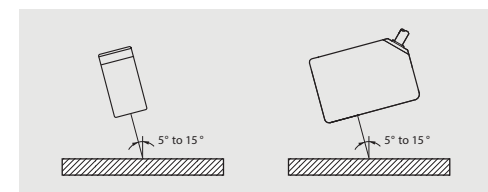
Adjust the sensor position st that it is set parallel to the surface of object to obtain reliable measurement.
If there is any foreign object around the spot that is glossier than the measuring object, it may cause incorrect measurement.

• Mounting

Make sure that the sensing side of the sensor is parallel with the surface of the sensing object. Normally, do not incline the sensor towards the sensing object.
The sensor is to be placed atleast 10mm away from any glossy or reflective surface.



The linearity of the output changes with the sensing angle. For best results the sensor should be exactly perpendicular to the sensing object. But the sensing will be normal upto ±15°



PRESETTINGS RESET

Turn on the power by pressing Select button and Set button at the same time and keeping them pushed continuously for 5 seconds. Then make sure if all the indicator blinks 3 times to confirm cancellation of all presettings.

NOTE

*Control output stops during teaching and setting period while Analog output works.

FUNCTION SELECT

◆ Teach Mode

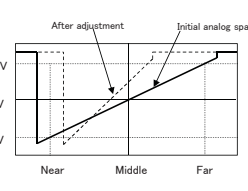
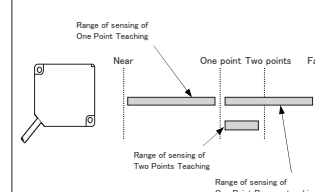
- Press the Select button for more than 5 seconds.
- Teach indicator lights up showing that Run status changes to Teach status.
- Function Indicator Lights up.
- Select function by pressing Select button.
- Adjust or select value of function you need by pressing Set button.
- Then return to RUN by pressing Select button for 5 seconds.

◆ Special Setting Mode




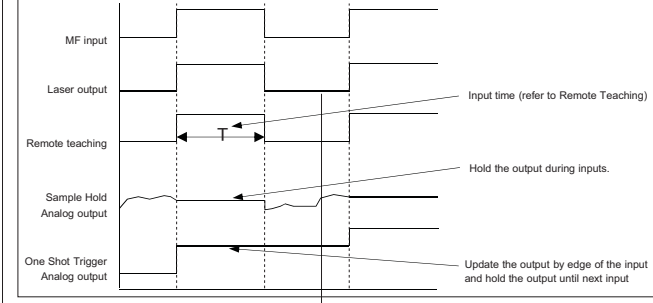



- Press simultaneously both Select and Set button for 5 seconds.
- Both Run and Teach indicators come up.
- Function indicator Q1 lights up.
- Select function by pressing Select button.
- Adjust or select value of function you need by pressing Set button.
- Then return to RUN by pressing Select button for 5 seconds.

FUNCTION SETTINGS

Teach Mode

| Function | Indication | Details | Settings and Adjustments | Factory Settings |
|----------------|------------|--|---|---|
| Span | 4mA 0V | Possible to coordinate analog output 4-20mA (0-10 V) at an arbitrary position in the rated range of measurement  | <ol style="list-style-type: none"> Push the Select button more than 5 seconds to get into Teach mode. Push the Select button and let 4mA (0 V) indication turn on. Set up the object at the first point that you want to span, and push Set button. 4mA (0 V) indication flashes one time. In case of adjustment failure, the indication flashes for 5 seconds. Try getting back to ② of the above. Push the Select button and let 20mA (10 V) indication turn on. Set up the object at the second point that you want to span and push the Set button. 20mA (10 V) indication flashes one time. In case of adjustment failure, indication flashes for 5 seconds. Try getting back to ③ of the above. Push the Select button for more than 5 seconds to return to Run mode. | Of the measurement range Near Side: 4mA (0 V) Far Side: 20mA (10 V) |
| | 20mA 10V | | | |
| Output Setting | Q1 | <p>Set the range of control output.</p> <p>One Point Teaching From the position of the teaching -0.15%(F.S.) to the near side of the sensing range.</p> <p>Two Point Teaching Between the position of the first point teaching +0.15(F.S.) and the position of the second point teaching -0.15(F.S.).</p> <p>One Point Reverse Teaching From the position of the teaching +0.15(F.S.) to the far side of the sensing range.</p>  | <p>One Point Teaching</p> <ol style="list-style-type: none"> Push the Select button more than 5 seconds to enter Teach mode. Push the Select button and let Q1 (Q2) indication turn on. Set the object in the position that you want to measure and push the Set button. Q1 (Q2) indication flashes one time. In case of adjustment failure, indication flashes for 5 seconds. Try getting back to ② of the above. Push the Select button for more than 5 seconds to return to Run mode. <p>Two Point Teaching</p> <ol style="list-style-type: none"> Push the Select button more than 5 seconds to enter Teach mode. Push the Select button and let Q1 (Q2) indication turn on. Set up the object at the first point of the range that you want to measure; push the Set button. Q1 (Q2) indication flashes one time. In case of adjustment failure, indication flashes for 5 seconds. Try getting back to ② of the above. Q1 (Q2) which you set up the object to the second point you want to measure and push the Set button. Q1 (Q2) indication flashes two times. In case of adjustment failure, indication flashes for 5 seconds. Try getting back to ② of the above. Push the Select button for more than 5 seconds to return to Run mode. <p>One Point Reverse Teaching</p> <ol style="list-style-type: none"> Push the Select button more than 5 seconds to enter Teach mode. Push the Select button and let Q1 (Q2) indication turn on. Set the object in the position that you want to measure; push the Set button for 5 seconds. Q1 (Q2) indication flashes one time. In case of adjustment failure, indication flashes for 5 seconds. Try getting back to ② of the above. Push the Select button for more than 5 seconds to return to Run mode. | The output in the measurement range |
| | Q2 | | | <p>One Point Reverse Teaching</p> <ol style="list-style-type: none"> Push the Select button more than 5 seconds to enter Teach mode. Push the Select button and let Q1 (Q2) indication turn on. Set the object in the position that you want to measure; push the Set button for 5 seconds. Q1 (Q2) indication flashes one time. In case of adjustment failure, indication flashes for 5 seconds. Try getting back to ② of the above. Push the Select button for more than 5 seconds to return to Run mode. |

Teach Mode (contd.)

| Function | Indication | Details | Settings and Adjustments | Factory Settings |
|----------------|------------|--|--|------------------|
| External Input | MF | Select the function of the external input.  Blink Once Fast (averaging 1 time)  Blink Twice Standard (averaging 16 times)  Blink Thrice High Resolution (averaging 64 times) | <ol style="list-style-type: none"> Push the Select button more than 5 seconds to get into Teach mode. Push the Select button and let MF indication turn on. Choose the function you need by pressing the Set button. Push the Select button more than 5 seconds to return to the Run mode. | Laser OFF |
| | |  <p>Possible to choose One Shot Trigger by Special setting mode.</p> | | |
| Averaging | Avg | Select the function of the external input.  Blink Once Fast (averaging 1 time)  Blink Twice Standard (averaging 16 times)  Blink Thrice High Resolution (averaging 64 times) | <ol style="list-style-type: none"> Push the Select button more than 5 seconds to get into Teach mode. Push the Select button and let Avg. indication turn on. Choose the function you need by pressing the Set button. Push the Select button more than 5 seconds to return to the Run mode. | averaging: 16 |

Remote Teach

Remote teaching is possible through External Input. Input time of Remote Teaching means change of settings.

| Input Time | Action Performed |
|------------------|---|
| 70 - 30 ms | The first point of span. |
| 170 - 230 ms | The second point of span. |
| 270 - 330 ms | Q1: One Point Teaching (The second point of Two Point Teaching must be completed in one minute with same value as the first point.) |
| 370 - 430 ms | Q1: One Point Reverse Teaching. |
| 470 - 530 ms | Q2: One Point Teaching (The second point of Two Point Teaching must be completed in one minute with same value as the first point.) |
| 570 - 630 ms | Q2: One Point Reverse Teaching. |
| 670 - 5000 ms | Offset** |
| 5000 ms and more | Offset cancel |

Remark: The sensor returns to RUN mode if no operation is performed in Teach/ Special Setting mode for 60 seconds.











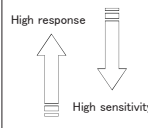
Note:

*- Self-diagnosis output comes at the time of (1) Laser Stop, (2) Saturation by mirror like object, (3) Low Sensitivity. This function does not work when the output of Q2 is set. Reset the sensor if self-diagnosis is to be used again.

** - The current measurement value will be the central position of the measured analog value by making offset (A: 12mA / V: 5 V)

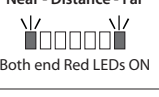




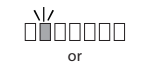


FUNCTION SETTINGS (contd.)

Remote Teach

| Function | Indication | Details | Settings and Adjustments | Factory Settings |
|--|------------|---|--|---|
| Analog Output when reflection is too high/ low | Q1 | <p>Set Analog output when impossible to measure due to too high/ low reflection.</p> <p> Blink Once: Analog output is fixed at about 22mA (approx.11 V).</p> <p> Blink Twice: The last value is fixed & maintained, and released when recovery.</p> | <ol style="list-style-type: none"> Push the Select and Set button at the same time for more than 5 seconds to enter Special Setting mode. Push the Select button and let Q1 indication turn on. Choose the function by pushing Set button. Push the Select and Set button for more than 5 seconds to return to the Run mode. | Analog output is fixed at about 22mA (approx. 11 V) |
| One Shot Trigger | MF | <p>One shot trigger can be selected through external input.</p> <p> On: One Shot Trigger</p> <p> Blink Once: Laser OFF</p> <p> Blink Twice: Remote Teaching</p> <p> Blink Thrice: Sample Hold (measurements fixed)</p> | <ol style="list-style-type: none"> Push the Select and Set button at the same time for more than 5 seconds to enter Special Setting mode. Push the Select button and let MF indication turn on. Choose the function by pushing Set button. Push the Select and Set button for more than 5 seconds to return to the Run mode. | Laser OFF |
| Sampling Period | Avg. | <p>Sampling Period Setting.</p> <p> Blink Once: 500 μs</p> <p> Blink Twice: 1000 μs</p> <p> Blink Thrice: 1500 μs</p> <p> On: 2000 μs</p> <p></p> <p>Shorter sampling period increases the response and longer sampling period enhances the sensitivity.</p> | <ol style="list-style-type: none"> Push the Select and Set button at the same time for more than 5 seconds to enter Special Setting mode. Push the Select button and let Avg. indication turn on. Choose the function by pushing Set button. Push the Select and Set button for more than 5 seconds to return to the Run mode. | 500 μs |

DISTANCE INDICATOR NOTATION

Distance indicator has seven LEDs. LEDs indicate the distance by moving towards near or far side.

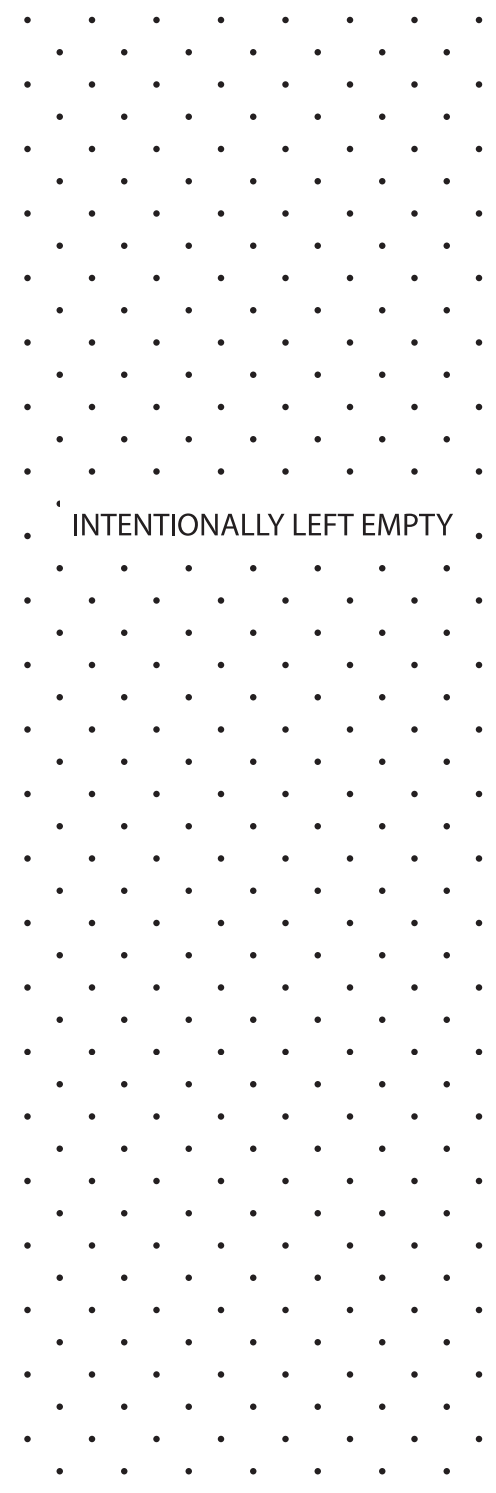
| Status of LED | Status of Measurement |
|--|---|
| <p>Near - Distance - Far</p>  Both end Red LEDs ON | Out of Range Turns on when the reflection is too High/ Low |
|  Near Side Red LED ON | Object is too Close |
|  Far Side Red LED ON | Object is too Far |
|  Far Side Green LED ON or  Far Side Green LED ON | Object not Far, just in range (Not ideal position) |
|  Near Side Green LED ON or  Near Side Green LED ON | Object not too close, just in range (Not ideal position) |
|  Middle Orange LED ON | Object Exactly in position (Ideal position) |

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