Checking width measurement with ZX-L

HOW-TO GUIDE

CONTENTS

Introduction

Thank you for purchasing the ZX-L-N Series Smart Sensor.

In this HOW-TO GUIDE we will check if a product has the correct width with fast repetition without the use of a PLC. In this guide we will only set up the result through the PASS or HIGH/LOW outputs on the sensor.

1.1. Notice

Further information can be found in the ZX-L-N User's Manual Z197.

1.2. Terms and Conditions Agreement

1 NO WARRANTY

1） The functions and function block Library is distributed as a sample in the hope that it will be useful, but without any warranty. It is provided “as is” without warranty of any kind, either expressed or implied, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. The entire risk as to the quality and performance of the function block is with you. Should the function block prove defective, you assume the cost of all necessary servicing, repair or correction.

2） In no event unless required by applicable law the author will be liable to you for damages, including any general, special, incidental or consequential damages arising out of the use or inability to use the function block (including but not limited to loss of data or data being rendered inaccurate or losses sustained by you or third parties or a failure of the function block to operate with any other programs), even if the author has been advised of the possibility of such damages.

2 LIMITATION OF LIABILITY

1) OMRON SHALL HAVE NO LIABILITY FOR DEFECT OF THE SOFTWARE.
2) OMRON SHALL HAVE NO LIABILITY FOR SOFTWARE PARTS DEVELOPED BY THE USER OR ANY THIRD PARTY USING THE FUNCTION BLOCK DESCRIBED ON THIS MANUAL.

3 APPLICABLE CONDITIONS

USER SHALL NOT USE THE SOFTWARE FOR THE PURPOSE THAT IS NOT PROVIDED IN THE ATTACHED USER MANUAL.

4 CHANGE IN SPECIFICATION

The software specifications and accessories may be changed at any time based on improvements and other reasons.

5 ERRORS AND OMISSIONS

The information in this manual has been carefully checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical, or proofreading errors, or omissions.

1.3. Safety Precautions

Definition of Precautionary Information

When using the ZX-L-N Smart Sensor, make sure to observe the following:

• The ZX-L-N Smart Sensor must be operated by personnel knowledgeable in electrical engineering.

• To ensure correct use, please read this manual thoroughly to deepen your understanding of the product.

• Please keep this manual in a safe place so that it can be referred to whenever necessary.

The following signal words are used in this manual.

⚠ WARNING	Indicates a potentially hazardous situation which, if not avoided, will result in minor or moderate injury, or may result in serious injury or death. Additionally there may be significant property damage.

⚠ CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or in property damage.

Meanings of Alert Symbols

The following alert symbols are used in this manual.

	Indicates the possibility of laser radiation.
	Indicates prohibition when there is a risk of minor injury from electrical shock or other source if the product is disassembled.

Laser Safety

■ ZX-LD□□□/ZX-LD30V□ Reflective Sensor Type Sensor Head

⚠ WARNING

Never look into the laser beam.
Doing so continuously will result in visual impairment.

Do not disassemble the product.
Doing so may cause the laser beam to leak, resulting in the danger of visual impairment.

■ ZX-LT□□□ Through-beam Type Sensor Head

⚠ CAUTION

Do not look into the laser beam.
Doing so continuously may result in visual impairment.

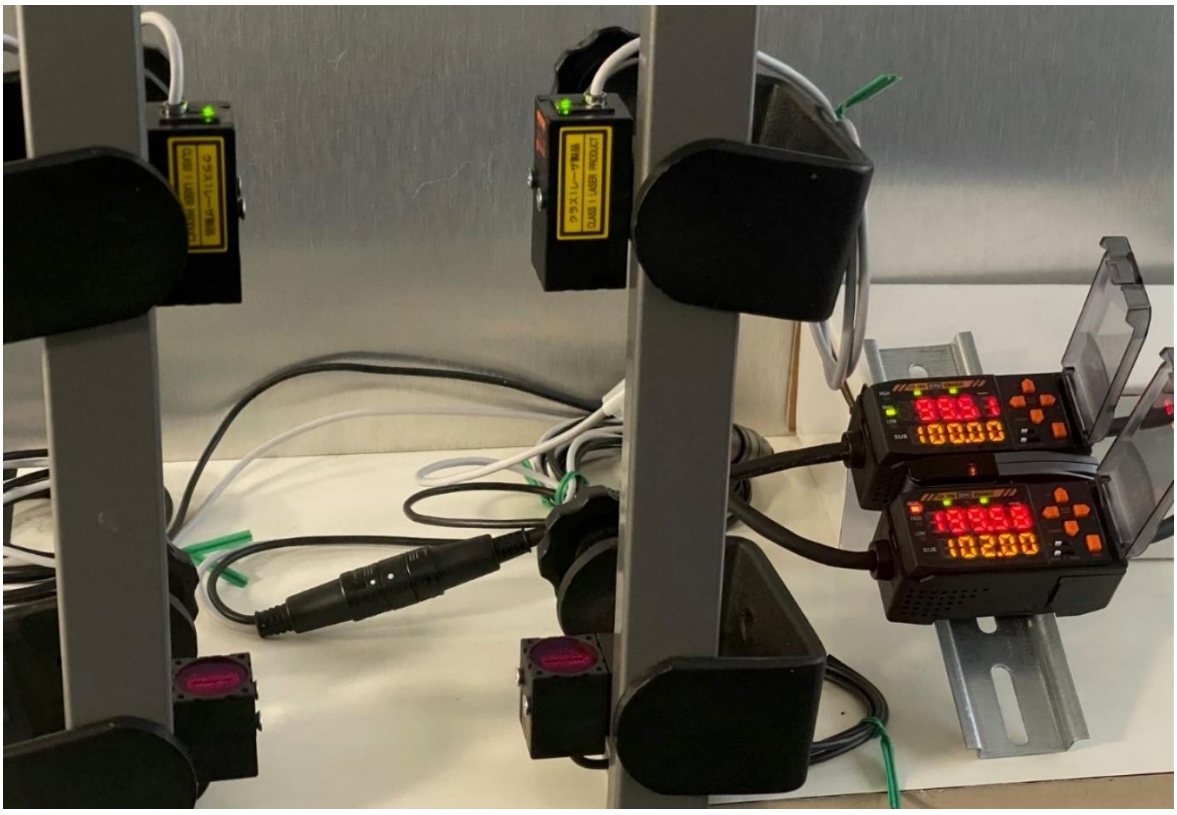
Preparations

Products used in this HOW-TO GUIDE

- 2 PCS – ZX-LDA41-N 2M Smart Sensor amplifier and display
- 2 PCS – ZX-LT010 Laser sensor head (through-beam)
- 1 PCS – ZX-CAL2 Calculation unit for ZX
- 1 PCS – 24VDC Power Supply

Image of our setup

Image below showing our setup for test purposes.



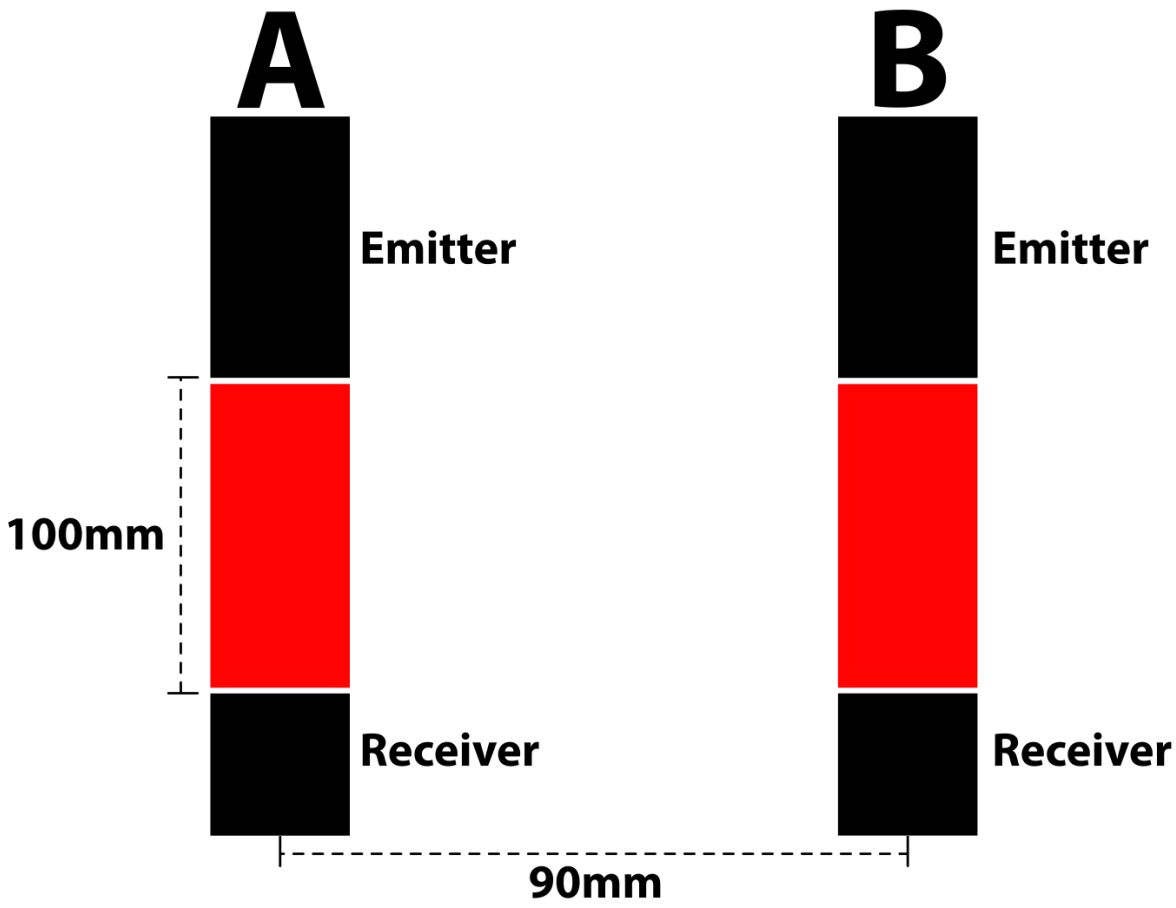
Setup and installation

In our example we will try to detect if our product has the correct width of 90mm. We are going to use the output connections of the ZX-LDA41N smart sensor giving PASS, HIGH or LOW signal.

Step 1: Placement of the components

First of we need to place the sensors within the condition of the datasheet. For our sensors we need to stay within 0-500mm between emitter and receiver. In our case we have chosen a distance of 100mm.

Due to our product having a width of 90mm, we also need to place the sensors with an exact distance of 90mm according to the illustration below.

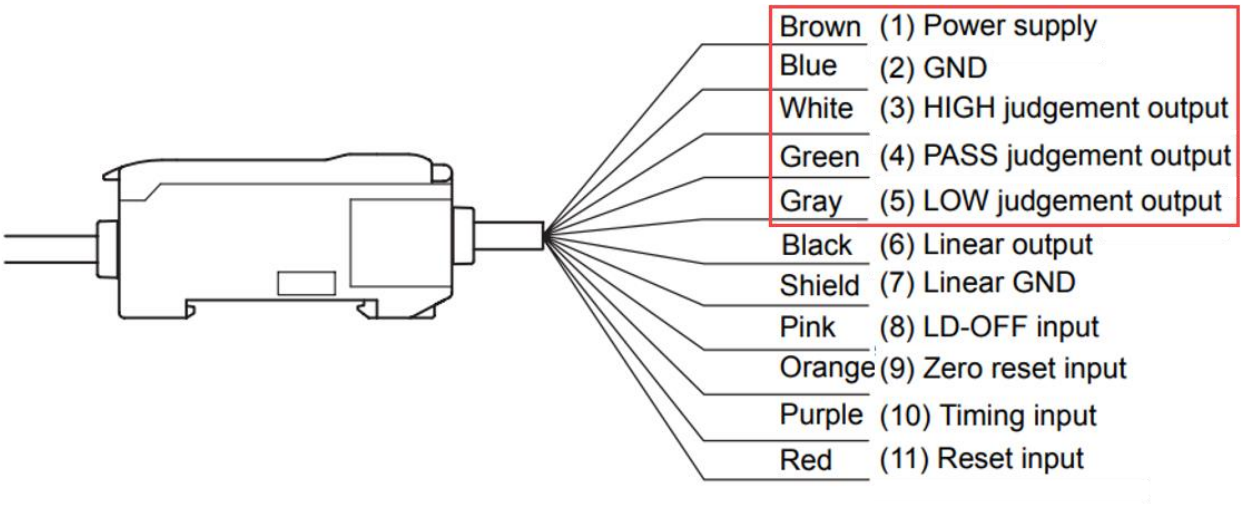


Step 2: Electric connection

Next step is to connect the sensors according to the user's manual Z197 for through-beam use with the calculation unit.

Apply 24VDC (1) and ground (2) to both amplifiers also according to the image below.

Connect the output signal HIGH judgement output (3), PASS judgement output (4), LOW judgement output (5) according to the manual depending on you have PNP or NPN model of the smart sensor.



Step 3: Power up the smart sensors

Now it is time to power up the smart sensors. Before you start working with the smart sensors please read the precaution below.

Precautions for Correct Use

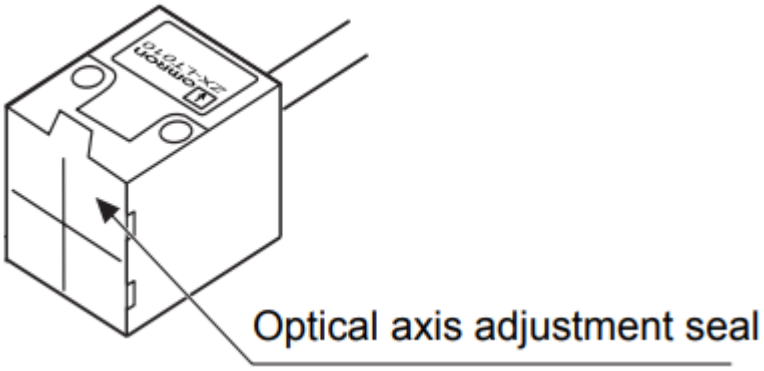
After turning ON the power supply, allow the product to stand for at least 10 minutes before use. The circuits are still unstable just after the power supply is turned ON, so measured values may fluctuate gradually

Step 4: Fix the alignment of the smart sensors

Now it is time to align the sensors to get the best result. Use the template (optical axis adjustment seal) provided in the box to get the alignment as good as possible. By looking at the display on the smart sensor try to reach the highest number possible to get the best result.

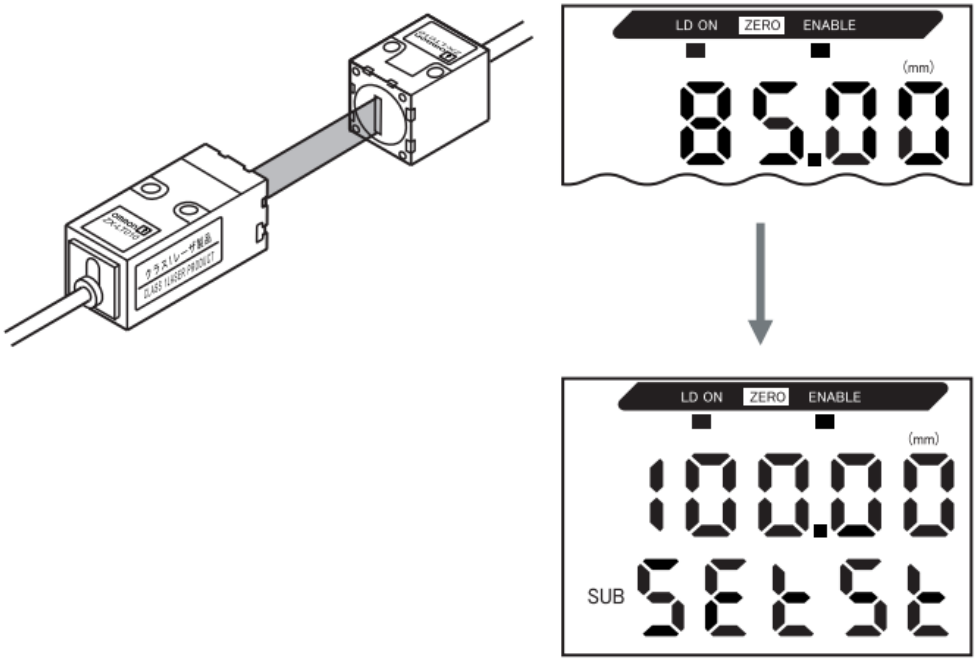
The number on the display is indicating the amount of light in percent that is received from the emitter.

Do this for both sensors.



Step 5: Setting the Standard Received Light Amount

This will reset the percentage of the received light to a full scale of 100%. Do this for both sensors.



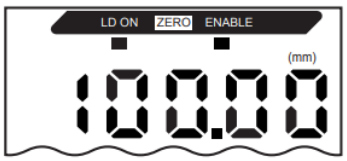
Moving to RUN Mode

1. Set the mode switch to RUN.

Setting the Standard Received Light Amount

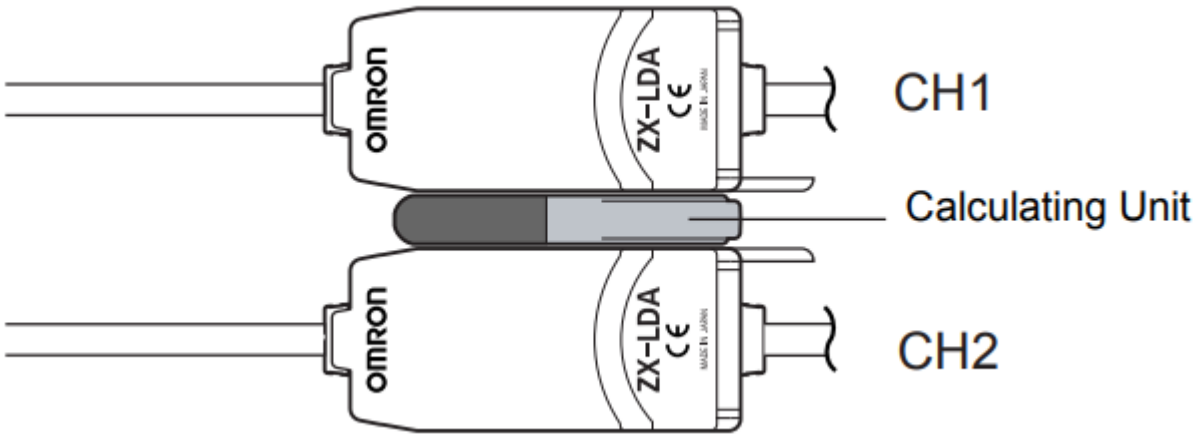
2. Hold down the DOWN Key for more than three seconds.

The standard received light amount that has been set will be stored in the memory of the Amplifier Unit.



Step 6: Performing Calculations (A+B)

Now we need to the set CH2 in calculation mode. We are going to use the A+B expression which will add together the amount of light from CH1 and CH2. Because we have in the previous step reset the scale, we should get the result of around 200% show on the display of CH2 smart sensor.



Additional Information

As a reference A+B on the display of the smart sensor will show as “AIb” due to the limitations of the display segment.

Moving to FUN and CALC

1. Set the mode switch to FUN on the CH2 Amplifier Unit.

2. Use the LEFT and RIGHT Keys to display [CALC] on the main display.

Selecting Expressions

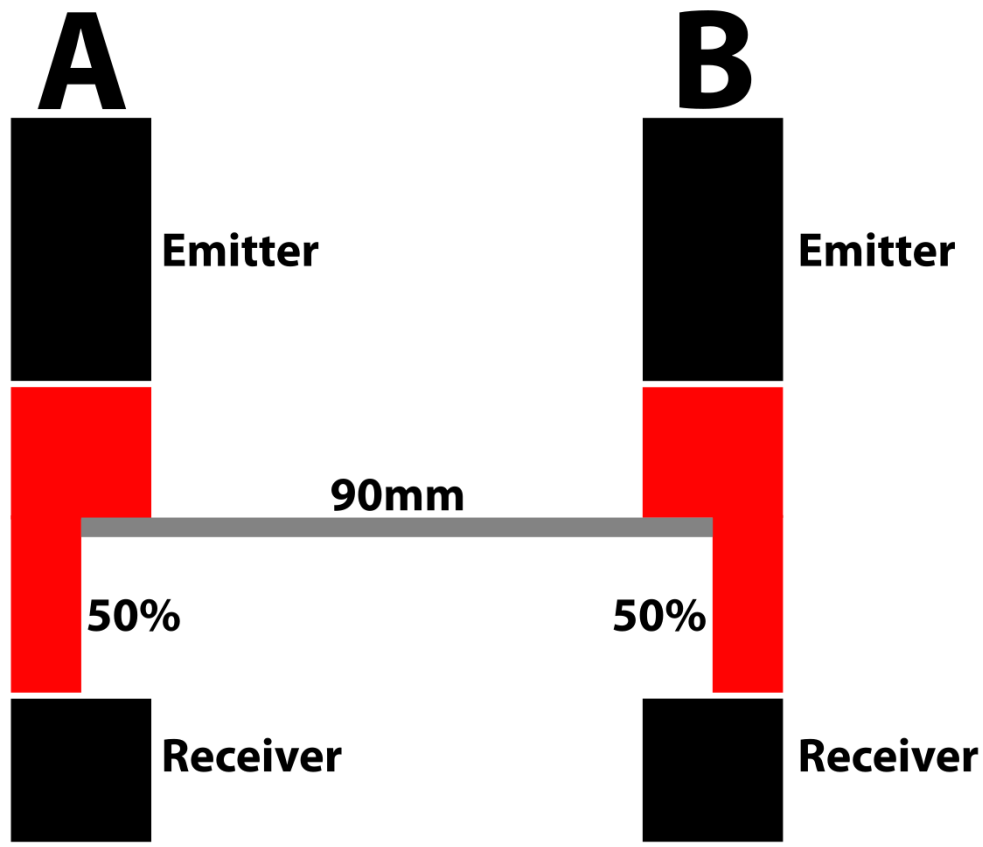
3. Press the UP or DOWN Key.
The sub-display will flash.

4. Use the UP or DOWN Key to select the desired expression.

5. Press the ENT Key to confirm the setting.
The setting will be registered.

Step 7: Test

Now it is time for testing. Because the product we are going to measure is 90mm and the placement of the sensors is 90mm apart from each other center-to-center. We will be blocking 50% of the light for each sensor as shown below. The exact placement of the product horizontally will not matter, because the light will be split up proportionally and the result of around 100% will be shown on the CH2 display.



Step 8: Entering Threshold Values and continued testing

We can now set the threshold values for the PASS, HIGH and LOW outputs and we only need to apply this setting for CH2. This may need to be fine-tuned depending on the environment and product that is being tested. Also depending on your or your companies demands of accuracy. In our case we finally settled on 102.00 for HIGH and 98.00 for LOW.

Moving to T Mode

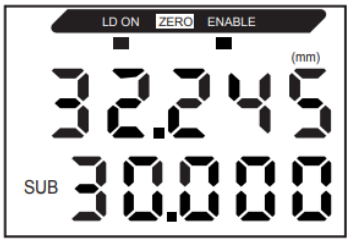
1. Set the mode switch to T.

Setting Threshold Values

2. Move the threshold switch to either H or L, i.e., the threshold to be set.

The current measured value will be displayed on the main display.

The currently set threshold value (either HIGH or LOW, depending on the threshold switch setting) will be displayed on the sub-display.



3. Press any Cursor Key.

The leftmost digit of the sub-display will flash.

4. Use the Cursor Keys to set the threshold value.

---- Moves from one digit to another.

---- Changes the current value.

5. Press the ENT Key to confirm the setting.

The setting will be registered.

Step 9: Test result

As seen below in the first picture, we have our product with the correct measurement of 90mm and we get a PASS output from the smart sensor. In the second picture we have applied a piece of tape on the side of the product which increases the total width of the product with about 0.1mm and the result in the display will show LOW on the smart sensor.