



Through-beam Edge Sensor ETD-0612

User's manual

Thank you for choosing AKUSENSE. Please read the manual carefully before using this product.

- The product should be applied by someone with a certain level of electrical knowledge.
- Please read and make sure that you understand how to operate the product before using it.
- Please keep this manual readily accessible for future reference when needed.

WARNING

Please comply with the warnings indicated below for they are important.

- Please do not exceed maximum rated voltage during usage in order to prevent tester malfunction or fire.
- Please do not apply AC power supply to avoid breakage.
- Please do not subject the product to high temperature to avoid scalding.

SAFETY PRECAUTIONS

For your safety, please comply with the tips listed below.

- Please do not use it in flammable or explosive environments.
- Please do not use it in environments with water, oil, chemicals or steams.
- Please do not disassemble, repair or alter this product.
- Please do not exceed the rated voltage and current.
- Please do not exceed the rated environment.
- Please observe electrical polarity when making connections.
- Please connect load correctly.
- Please avoid short-circuiting the load.
- Please do not operate it, if the housing is broken.
- When disposing the tester, please treat it as an industrial waste.

NOTICE FOR USE

- Do not use in the following places :
Daylight direct place
High humidity, easy to open places
Place containing corrosive gases
Vibration, shock directly to the product body of the place
- This product wire and power lines used in the same piping, will be disturbed, malfunction or even destroyed.
- The extension wire must use a wire with a cross-sectional area of 0.3 mm² or more and a length of 100 m or less. When the Korean S-mark certification model is used as a certification product, please set it below 10m.
- For the force applied to the wire, please refer to: below 40N, 0.1N.m torque less, 20N or less, and 3Kg below the bending.
- When the power is turned on, the product can be detected within 200ms. So if the load and product connected to a different power supply, you must first turn on the product power.
- When the power is turned off, the output pulse may be generated, so please cut off the power supply of the load or load line.
- Please do not use thinner, gasoline, acetone, kerosene and other solvents to clean up.

PACKAGE CONTENTS

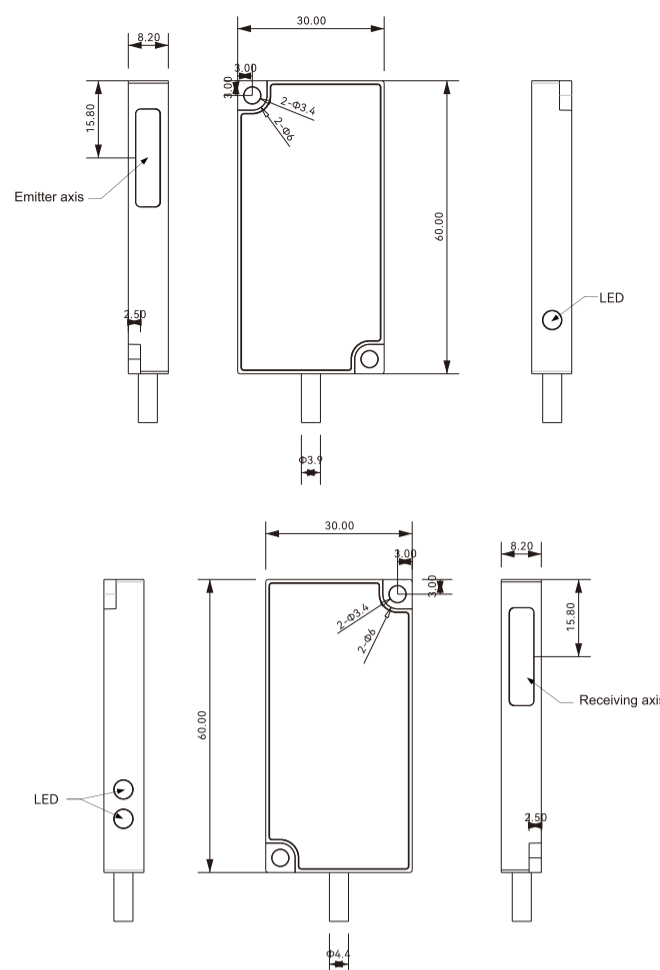
- Sensor 1pcs
- User's manual 1pcs

SPECIFICATION

Model	ETD-0612	
Detection method	Through-beam laser measuring (CMOS mode)	
Detection range	Edge detection mode ±6mm Diameter detection mode 12mm	
Setting distance	0 ~ 500mm	
Light source	Red semiconductor laser level 1	
Laser class	Class 1	
Minimum detectable object	ø0.5mm(When setting a distance of 500mm)	
Repeatability	1µm(When setting a distance of 20mm) 3µm(When setting a distance of 100mm) 5µm(When setting a distance of 500mm)	
Linear accuracy	±0.12%F.S.(When setting a distance of 20mm) ±0.4%F.S.(When setting a distance of 100mm)	
Response time	1ms	
Analog output	Voltage	Output range: 0V~5V, output impedance: 100Ω
	Current	Output range: 4mA~20mA, load: less than 300Ω
Communication	485 communication hexadecimal	
Measurement mode	Auto Edge Mode, Edge Mode, ID/Gap Mode, Width/Diameter Mode	
Operation temperature	-10 ~ +45°C(No freezing, No condensation)	
Storage temperature	-20 ~ +60°C	
Operation humidity	35 ~ 85%RH	
Storage humidity	35 ~ 85%RH	
Voltage	DC12~24V±10%	
Current consumption	Emitting: 10mA or less (DC24V) Receiving: 70mA or less (DC24V)	
Insulation	Insulation resistance >20MΩ at DC500V between all terminals and housing	
Pulse resistance	Durable 500m/s ² , 3 times each in X,Y,Z three directions.	
Anti-vibration	Durable 10 ~ 55Hz complex amplitude 1.5mm, 2 hours each in X,Y,Z three directions	
Ambient illumination	Incandescent lamp: the illuminance of the light-receiving surface is below 3,000lux	
Temperature drift	±0.03%F.S./°C	
Indicator light	Emitter (laser emission indicator green) Receiver (optical axis adjustment light green, judgment output light red)	
Protection degree	IP50	
Shell	Aluminum alloy metal shell	
Outgoing way	Receiver:5-core composite cable 2m Emitter: 2-core cable 2m	

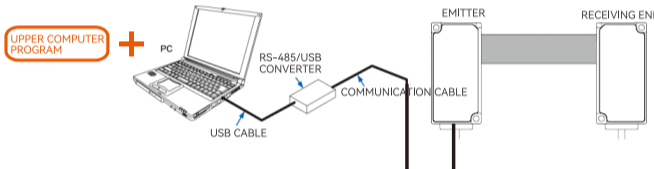
DIMENSIONS

Unit: mm

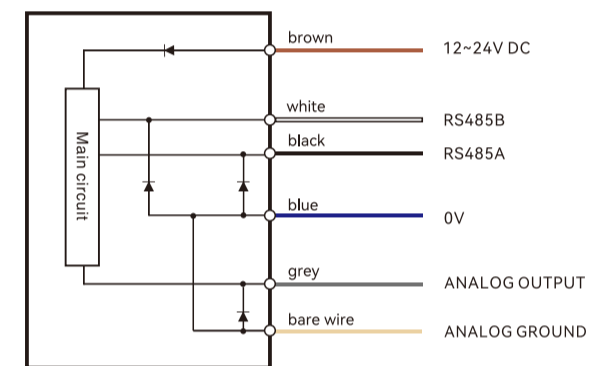


INSTALLATION

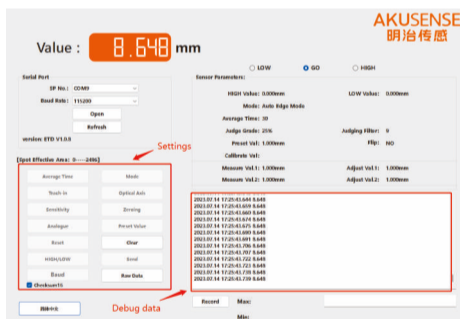
- Fix the sensor transmitter and receiver at a distance of 50cm or less (the shorter the installation distance, the better the measurement effect).
- Connect the power cord: brown and blue wires are connected to the power cord (12~24V), and the receiver and transmitter end can be connected separately or together.
- RS485 connection, need to use USB/RS485 converter, receive end black to RS485 [A+], white to RS485 [B-]



CIRCUIT DIAGRAM



AUXILIARY UPPER COMPUTER SOFTWARE



The role of the auxiliary upper computer is mainly used to view measurement results, set sensor parameters, optical axis calibration, etc. The current latest version is ETD V1.0.2, if you find the version is lower than this version, you need to contact the technical staff to update the version.

- Connecting the sensor to the RS485/USB converter;
- Click the "Refresh serial port button" in the serial port area, and select the correct serial port in the list of "serial port number" (PS:you can confirm the serial port corresponding to RS485 through the computer's device management, the serial port number varies from computer to computer, COM10 on my computer);

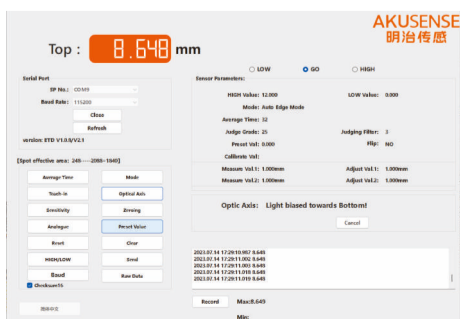


- Baud rate is currently only supported at "115200" and is not available for user selection;
- By clicking the "Open" button, the host computer can start communicating with the sensor.

OPTICAL AXIS ADJUSTMENT AND OPTICAL AXIS REFERENCE WAVEFORM REGISTRATION

1. Optical axis calibration
For more accurate measurements, it is recommended to perform an optical axis calibration during installation, which is used in conjunction with the PC-based host computer. Make sure that there are no objects between the sensors, click on the "Optical axis calibration" button in the setup area of the PC software, the information about the optical axis will appear on the right side, and follow the instructions to move the sensors:

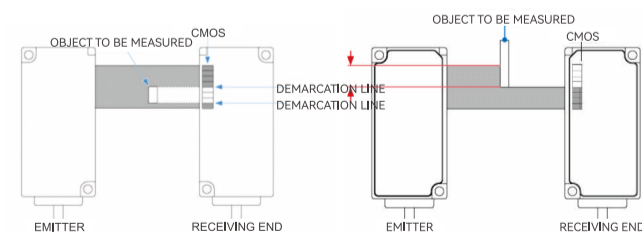
- If the optical axis is off TOP, the light near TOP at the receiver will flash, and the upper computer will indicate "optical axis is off TOP";



MEASUREMENT MODE SELECTION

1. Measurement principle:

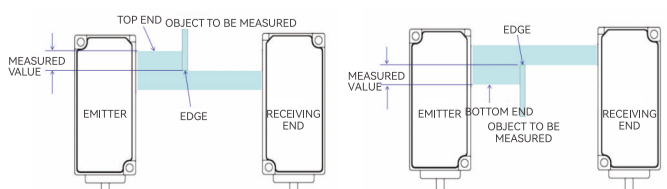
The laser light emitted from the transmitter is received in the sensor by the receiving element (CMOS) at the receiver end. By moving the measurement object between the receiver and the emitter, the bright part (incoming light part) that is irradiated to the laser and the gray part (shading part) that is the shadow of the measurement object are projected onto the CMOS. Since the amount of light received by each box number on CMOS is different, the measurement of the real time object is performed by detecting the position information of the boundary between the incoming and shaded parts.



- Measurement Mode
The following 4 modes are supported:
(1) Automatic edge mode (2) Edge mode (3) Inside diameter/slit pattern (4) Width/diameter mode

3. Automatic edge mode (product default measurement mode)

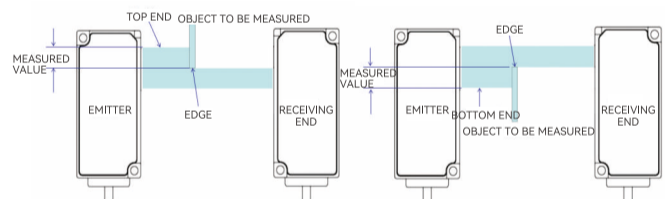
The program automatically identifies the direction of the measured object to the measurement area (Top end or Bottom end) and calculates the distance from the end of the entry side to the edge, which is the measurement distance.



Note: There are no measurements for (1) full incoming light and full outgoing light, and (2) two or more edge states.

4. Edge detection mode
Specifies the distance to the edge when the object under test enters the direction of the detection area (TOP end entry or BOTTOM end entry).

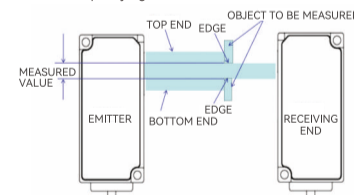
- Set the entry direction to TOP end
The distance from the edge to the TOP end is detected with the TOP end as the reference.
- Set the entry direction to the BOTTOM side
The distance from the edge to the BOTTOM end is detected with the BOTTOM end as the reference.



Note: There are no measurements for the following case:

5. I.D./slit pattern

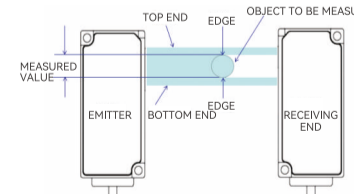
It is used to measure the inside diameter and gap of an object. Detects the distance between the edge from "shade to incoming light" and the edge from "incoming light to shade" as the measurement value, without specifying the measurement direction



Note: No measurement results are available for the following cases: the state of more than two edges.

6. Diameter / Width Mode

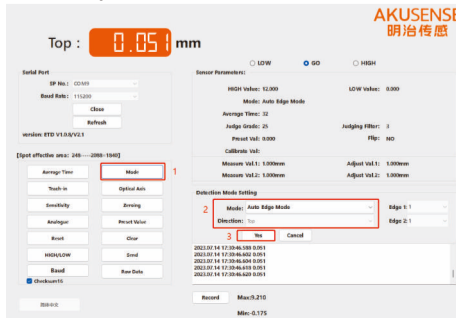
Measures the shape and width of an object. The distance between the "incoming to shaded" edge and the "shaded to incoming" edge is measured without specifying the measurement direction.



Note: No measurement results are available for the following cases: the state of more than two edges.

7. Detection mode selection

After the host computer contacts the sensor through RS485, in the setting area of the host computer software, click on the "mode selection button", a mode selection drop-down menu will appear on the right, select the corresponding menu and press the confirmation button to complete the setting, as shown in the figure



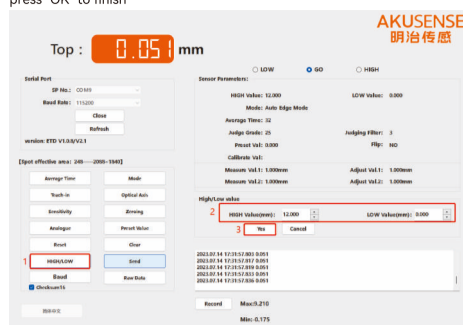
Only the edge mode needs to select the detection direction, the others do not.

THRESHOLD SETTING

Threshold setting is supported in two ways:

1. HIGH/LOW value setting

In the setup area of the host software, click the "HIGH/LOW value setting" button, and enter the corresponding HIGH and LOW values in the "HIGH/LOW value setting" interface on the right side, then press "OK" to finish

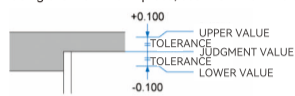


2. Teaching

The purpose of teaching is also to set HIGH/LOW values, and 3 types of teaching are supported:

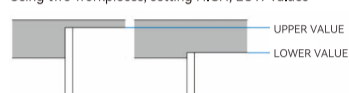
(1) Single Point of Instruction:

Using the main work-piece, set HIGH/LOW values by \pm tolerance



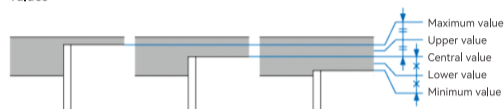
(2) Two points of teaching:

Using two workpieces, setting HIGH, LOW values

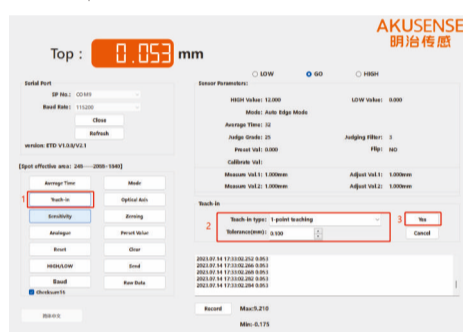


(3) Three points of teaching

Use good products, HIGH side defective products, LOW side defective products, set HIGH and LOW values



Teaching setting: In the setting area of the upper computer software, click the "Teaching" button, and then the "Teaching" interface will appear on the right side to select the teaching method first, and then put the workpiece according to the prompt, and then press "OK" after selection. After selecting, press "OK" to set up.



ANALOG OUTPUT

Support two types of voltage and current analog output, through the gray analog output line output corresponding analog

1. Voltage output 0-5V

Converts the measured range 0-12mm to 0-5V, where the

- (1) 0V output when there is no subject at full incidence;
- (2) Half masking with an output of 2.5v for a measurement of 6.000mm;
- (3) Output 5V at full range 12mm.
- (4) No incoming light, defined as the full shading case, the same output 5V

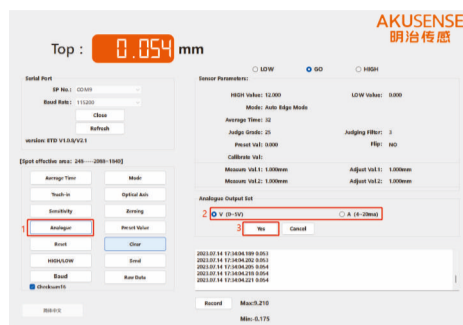
2. Current output 4-20mA

Converts the measured range 0-12mm to 4-20mA, where the

- (1) 4mA output when there is no object to be measured at full light entry;
- (2) Half masking, 12mA output when the measurement result is 6.000mm;
- (3) Output 20mA at full range of 12mm.
- (4) No incoming light, defined as the case of full blocking, the same output 20mA

3. Analog output selection

In the setting area of the upper computer software, click on the "Analog Output" button, and the analog output voltage output and current output will appear on the right side, select and press "OK" to complete the setting.

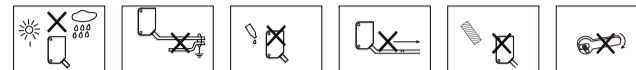


RS485 DIGITAL OUTPUT

This sensor supports RS485 digital output, and the related commands and protocols are detailed in "ETD-0612 Corrective Command Set V1.0.docx"

REGULAR MAINTENANCE CHECK

- During the use of regular inspection, maintenance is necessary, to ensure the normal operation of the machine. Periodically check items as follows:
- When the object is detected, whether the switch is in the distance, whether there is a loose phenomenon, whether there is a tilt correction, whether the inspection has changed.
- Wiring or other connection lines, whether the contact is normal, or no break.
- Does the sensor face dust?
- Check operating temperature, and the surrounding environment is suitable.
- Installation space, whether there has difference, such as vibration, electrical leakage
- Other :
- When the power is applied, the sensor needs 100ms lead time, in order to achieve stable output of the sensor, so during this time, do not operate the sensor. Avoid being applied to the outside (except for shelter).
- Avoid direct contact with organic solvents.
- To prevent the detection surface by the impact of objects, because the sensing surface is very fragile.
- When the device or motion switching power supply can not be too pull, move.



PRECAUTIONS

- Make sure that the power is turned off when connection.
- Make sure that the supply voltage changes within the rated range.
- If the power supply is supplied by a commercial switch regulator, make sure that the power supply ground terminal (F.G) is grounded.
- Be sure to ground the device ground terminal (F.G).
- Do not use when power on within 0.5s.
- Do not run the line with a high voltage line or a power cord or in a wire tube, which may cause malfunction due to induction.
- Avoid dust and water vapor.
- Do not expose the sensor to direct contact with water, oil, grease or organic solvents, such as thinner.

WARRANTY

Warranty period

- The product warranty period is one year, from the date of delivery of the product to the date of purchase.

Warranty range

1. AKUSENSE will repair the product free of charge if there is a malfunction caused by AKUSENSE Company in the above warranty period. But the following is not covered by the warranty.
 - Not in accordance with the operating instructions, the user manual or the purchaser and the AKUSENSE company specifically reached the technical requirements of the conditions specified in the environment under the incorrect operation, or improper use of appropriate failure.
 - Failure is not due to product defects, but the purchaser equipment or the purchaser software design caused.
 - Malfunctions caused by modifications or repairs by non-AKUSENSE company personnel.
 - In accordance with the operating instructions or user manual correct repair or replacement of wearing parts and other provisions can be completely avoided failure.
 - In the product from the AKUSENSE company after delivery, due to unpredictable changes in science and technology and other factors caused by the failure.
 - Due to fire, earthquake and floods and other natural disasters, or abnormal voltage and other external factors caused by the fault AKUSENSE company is not responsible for the warranty.
2. The warranty is limited to the conditions specified in Article (1), and AKUSENSE Company shall not be liable for any indirect loss (damage to equipment, loss of opportunity, loss of profits, etc.) or other loss caused by its equipment.