Instructions for use of the microwave sensor

XKC-LD500B-INFO

Catalogue

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1. Product overview

XKC-LD500B is mainly used in indoor scenes to perceive whether there is movement or micro human body in the area, and output the detection results in real time. The maximum induction distance can reach 10 meters (the detection distance is related to the direction of the sensor installation). Can be widely used in various scenarios of AIoT, often used in human induction light control, advertising screen and other devices human induction wake, life safety protection, intelligent home appliances, intelligent security, etc.

2. product features

1. In addition to the movement of the human body induction sensitive, for the traditional scheme can not identify the micro human body can also be sensitive induction;
2. Have good environmental adaptability, the induction effect is not affected by the temperature, brightness, humidity and light fluctuations and other surrounding environment;
3. Not easy to be affected by dirt, dust and other cover interference;
4. Can pass through the glass, plastic, ceramic, acrylic, rubber, wood board and other non-metallic materials;
5. The maximum induction distance is up to 10 meters;
6. Support the hanging roof, hanging the wall and other installation methods;

3. operational principle

The XKC-LD500B is a human presence state sensor designed based on microwave radar. The sensor is fully integrated with a 5.8GHz microwave circuit, an IF amplifier circuit, a signal processing circuit, and a powerful MCU. To detect the human body target in the set space, combined with radar signal processing and accurate human body sensing algorithm, to realize the highly sensitive human existence state sensing, can identify the human body in the motion and micromotion state, and there are a variety of output ways to choose from.

4. Product technical parameters

project name	parameter
input voltage	DC9V-24V，±5%
Average power consumption	＜0.75W
emission frequency	5725MHz~ 5875MHz
transmitting power	-5dBm
detection range	5m (default factory value)

response speed	< 1500mS
Target away from delay	2S (10-60S custom-adjustable)
Power stability time	5S
working temperature	-10 ~ 60℃
Storage temperature	-10 ~ 60℃
Output method	NPN, high and low level, relay, UART serial port
wire length	Four-wire 500MM (± 10%) (batch customizable)
Case material	ABS+PC
Waterproof performance	IP67
Safety regulations refer to standards	GB/T2423,GB/4208-2017,GB/T17626.1-2006
Environmental protection reference standard	ROHS-2.0

Note: NPN output mode is protected with error line, but UART serial port version has no protection function, please miserror.

5. Output method

order number	model	Output method	Enter the induction zone	Leave the sensor
1	XKC-LD500B-NPN	NPN open output (normally open)	Load work	The load does not work
		NPN open-leak output (normally closed)	The load does not work	Load work
3	XKC-LD500B-V	High and low level signal output (positive output)	Output of the high-level VCC	Output at a low level of 0V
		High and low level signal output (reverse output)	Output at a low level of 0V	Output of the high-level VCC
4	XKC-LD500B-UART①	UART serial port output	Whether there is in the report area	
5	XKC-LD500B-M	Relay (normally open)	Load work	The load does not work
		Relay (normally closed)	The load does not work	Load work

Signal description:

NPN output: NPN output is one of the three-wire switching volume output. When the sensor is induction, the output is a low level signal, and the output of the sensor is a high resistance, and the high and low level can be determined by external access pull resistance. The NPN output can directly control the current within 300mA.

High and low level signal output: the sensor provides a high and low level signal, which is suitable for small current control of large current, control of external circuit, MCU signal identification and judgment, etc.

Relay output: the signal sent by the switching volume sensor is the dry contact signal, with disconnected and closed two states, such as the sensor switch is a common switching volume sensor. The sensor switch is disconnected (or closed) when the object enters the sensor induction area and the switch closes (or disconnected) when the object leaves the sensor setting induction area.

UART serial port output: the user can configure the relevant parameters through the UART communication protocol, or specify the factory default configuration value.

Note ①: The grey model is not yet available for sale.

6. The LED light indicator table

Sensor status	LED indicate	Alarm prompt: When the product output appears overflow (about more than 350 mA), LED flash flash (about 60MS).
In the sensitivity setting	The LED flashes up to once	Sensitivity set to low (without signal interference, detection distance 0~2 m)
	The LED flashes 2 times	Sensitivity set to intermediate (detection distance 0-5 m)
	The LED flashes 3 times	Sensitivity set to high grade (without signal interference, detection distance 0~7.5 m)
	The LED flashes 4 times	Sensitivity set to upscale (no signal interference environment, detection distance 0~10 m)
Output mode is set in	LED light flash flash (3 times-200MS) -out (1S) -on (1S) -out	The output mode is set to normal closed or reverse output
	LED light flash flash (3 times-200MS) -out (1S) -bright (3S) -out	The output mode is set to normal open or positive output
in use	LED often bright	Object detected (factory default, set to reverse output through serial port)
	LED is often destroyed	No object detected (factory default value, can be set to reverse output by serial port)
	LED twinkle	In the sensitivity setting

7. Installation environment requirements

The product needs to be installed in the suitable environment, if used in the following environment, the test effect will be affected:

1. There are non-human objects with continuous movement in the induction area, such as animals, curtains that keep swinging, and large green plants facing the air outlet
2. There is a large area of strong reflector in the induction area, which can cause interference to the radar antenna

3. When installing the hanging wall, it is necessary to consider the external interference factors such as the air conditioning and electric fan on the top of the room
4. When installing the product, avoid the direct signal of WiFi router or mobile telecom base station, otherwise it may affect the detection distance.

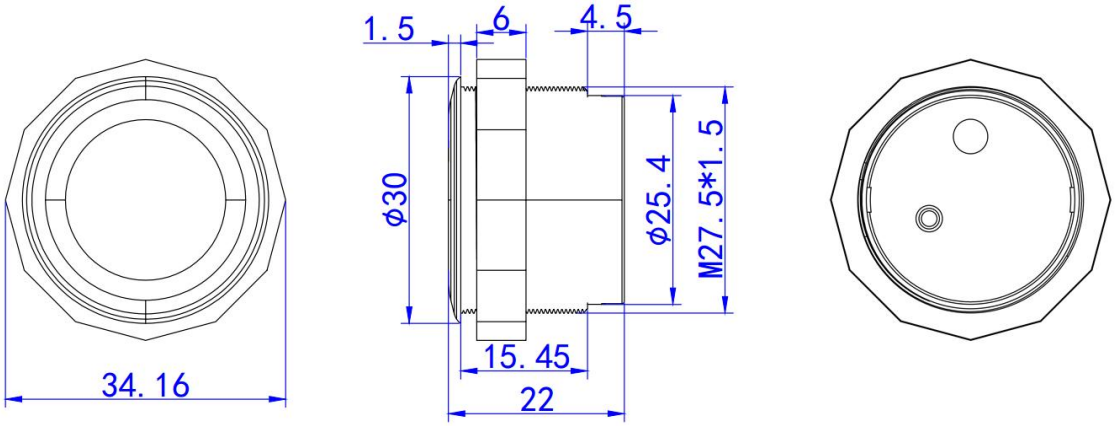
8. Notes required during installation

1. Try to ensure that the radar antenna is facing the area to be detected, and the antenna is open without shielding
2. Try to avoid pointing the radar antenna directly facing large metal equipment or pipes
3. The radar sensor should avoid the AC drive power supply and try as far away from the rectifier bridge as to avoid the power frequency interference
4. To ensure that the installation position of the sensor is firm and stable, the shaking of the radar itself will affect the detection effect
5. Make sure that there is no movement or vibration on the back of the radar. Due to the penetration of the radar waves, the antenna signal back flap may detect the radar back

The moving object of the surface. Metal shield or metal backplane can be used to shield the radar back flap and weaken the impact of the radar back object.

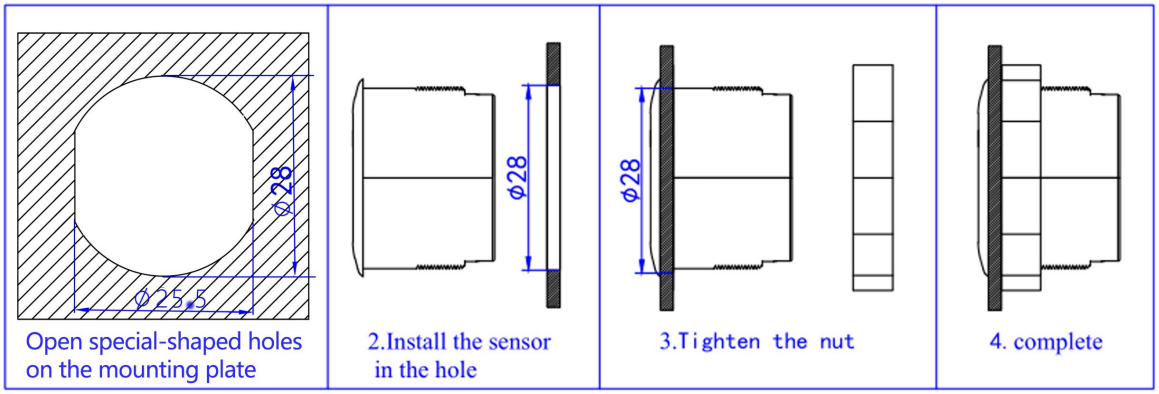
6. When several radar sensors are fixed, the spacing between each device shall be 1m

9. Product size



10. Installation method

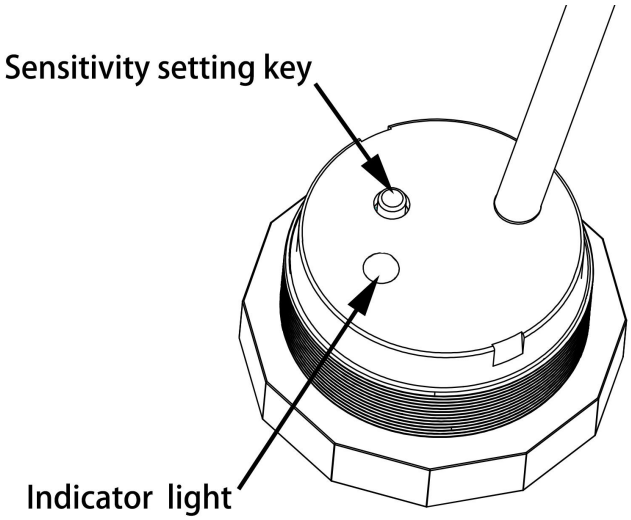
Open the hole in the panel of 28mm. Install the sensor from the front of the panel and tighten the nut behind the sensor.



11. sensitivity gear adjustment

The default sensitivity of the sensor is in the middle gear. If the detection area is complex, the sensitivity can be adjusted to a lower gear; if detected or missed, the sensitivity can be adjusted to a higher level. Sensitivity gear can be adjusted by serial port or by key press.

Sensor power, normal working state, find the key, then press the key, the indicator light flashing 1 time set to low sensitivity (detection distance 0~2 meters), the indicator light flashing 2 times set to medium sensitivity (detection distance 0~5 meters), the indicator light flashing 3 times set to high sensitivity (detection distance 0~7.5 meters), indicator light flashing 4 times said set to high sensitivity (detection distance 0~10 meters), through the key can switch between the four gears.



12. Output mode setting

The factory output mode of sensors XKC-LD500B-NPN and XKC-LD500B-ex-M is normally open by default, and the factory output mode of XKC-LD500B-NPN is positive output by default. If the output mode needs to be changed in actual use, it can be set by the following methods:

The sensor switches on the power, normal working condition, find the button, and then press the button for 5 seconds,

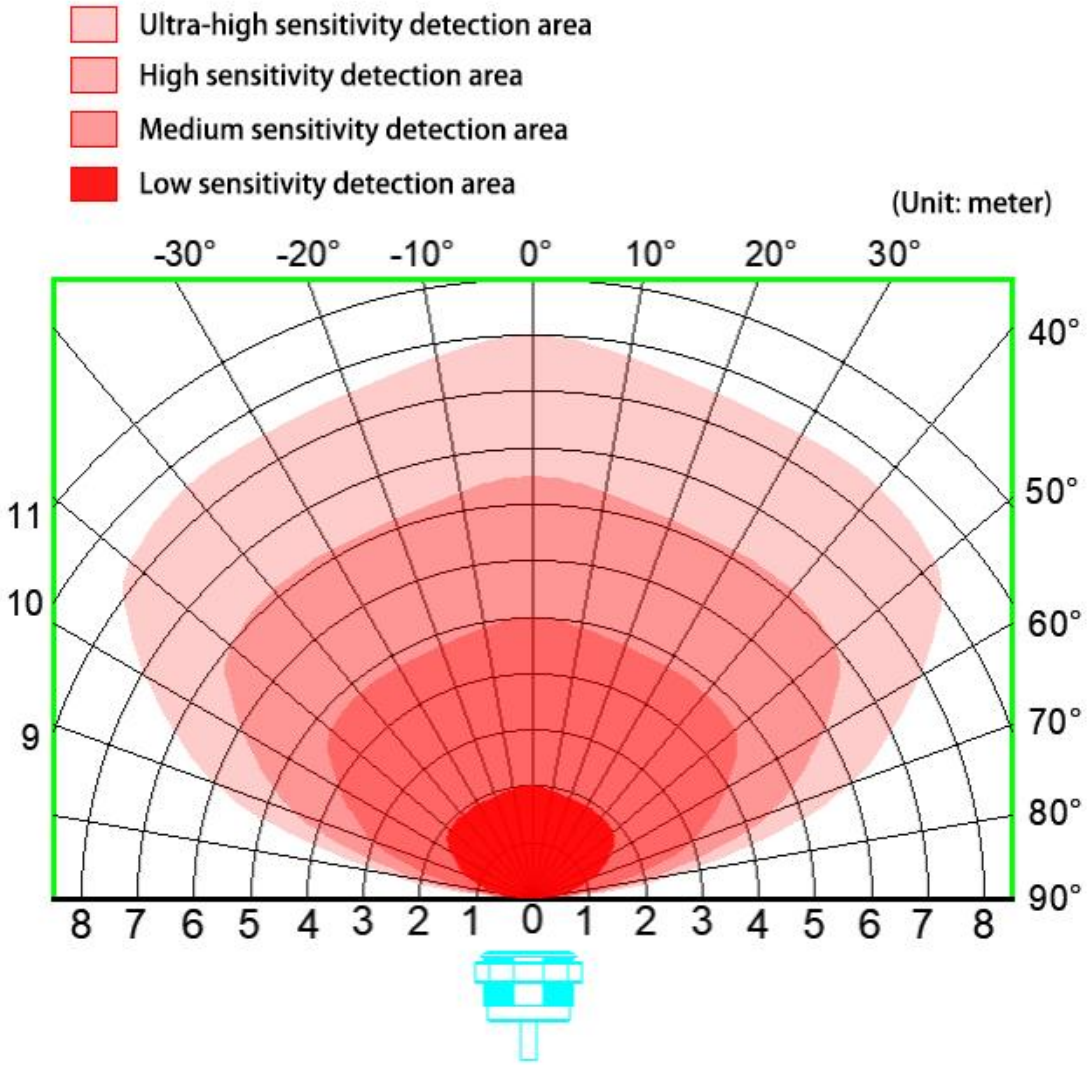
Light flash (3 times-200MS) -Off (1S) -flash (1 time, 400ms), indicating that the output mode is set to normally closed or normally high output.

Light flash (3 times-200MS) -Off (1S) -flash (2 times, 200ms), indicating that the output mode is set to normally open or normally low output.

13. Protectable areas

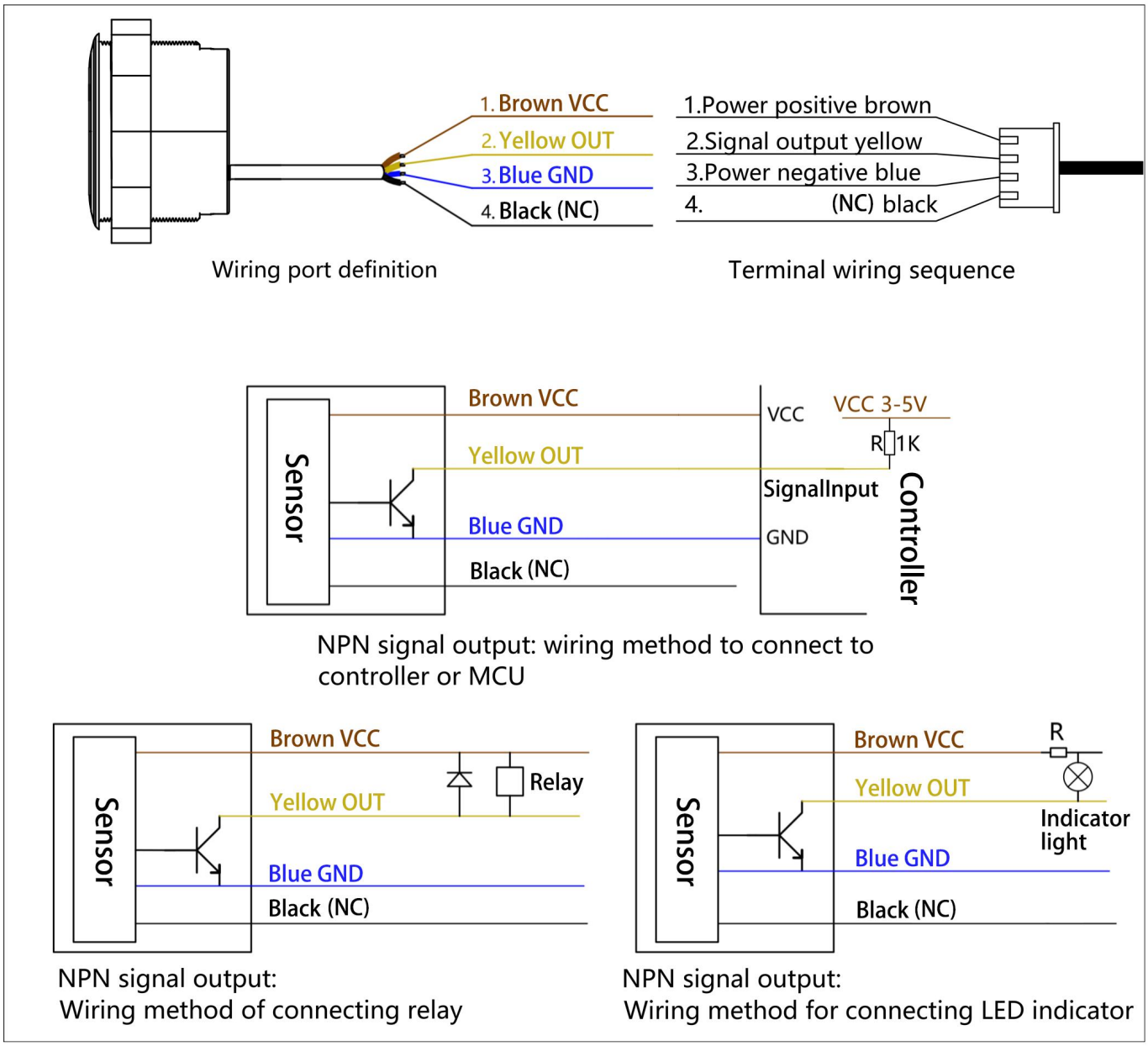
Place the human presence state sensor horizontally at 1.2 meters high, and adults walk normally in a detectable area.

Note: The detection area is related to the walking body movement amplitude and the walking speed. The detection Angle is 360 degrees detecstable, and the positive effective Angle is 120°. The higher the gear, the higher the sensitivity, and the greater the induction distance. The sensitivity of the back induction is less than the sensitivity of the front, the distance can be about half of the distance, but can not penetrate the cement wall of more than 15 cm.



14. Output principle and recommended wiring method

Schematic diagram of XKC-LD500B-NPN



NPN output drive small relay (coil current 300 mA) Operating principle:

The output mode is normally open

When the object is induced, the transistor is connected and closed, and the relay is electrified and engaged;

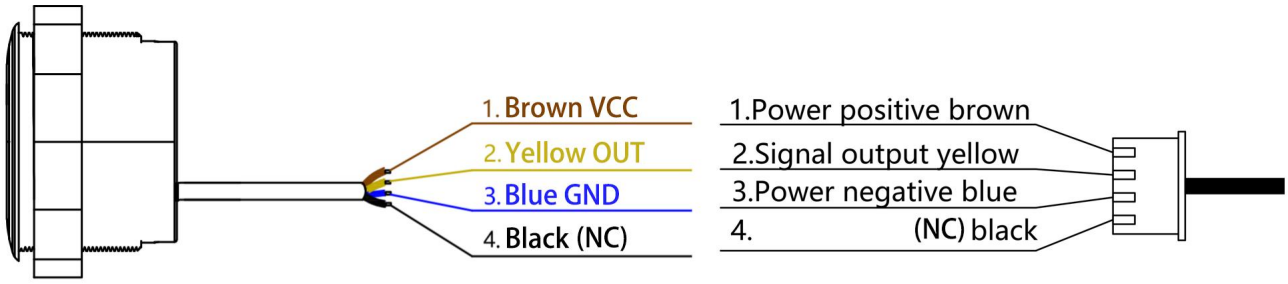
When the object is not induced, the transistor is off and the relay is not off;

The output mode is normally closed time

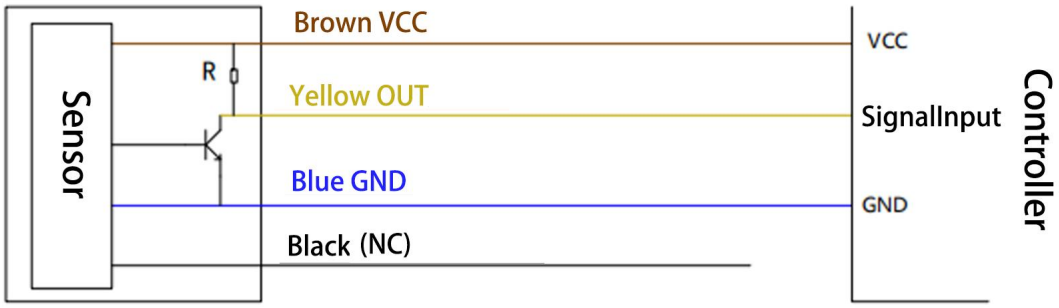
When the object is not induced, the transistor is closed, the relay is suction;

When the object is induced, the transistor is off, the relay power does not absorb;

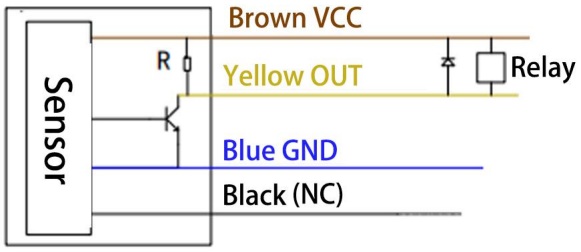
2. Simplified principle of XKC-LD500B-V high and low level output wiring



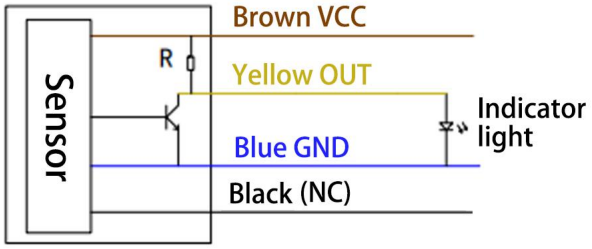
Wiring port definition　　Terminal wiring sequence



High and low signal output: wiring method to connect to controller or MCU



High and low signal output:
Wiring method of connecting relay



High and low signal output:
Wiring method for connecting LED indicator

High and low level output drive small relay (coil current 300 mA) Operating principle:

When the output mode is positive output

When the object is induced, the transistor off output high level, relay power does not absorb;

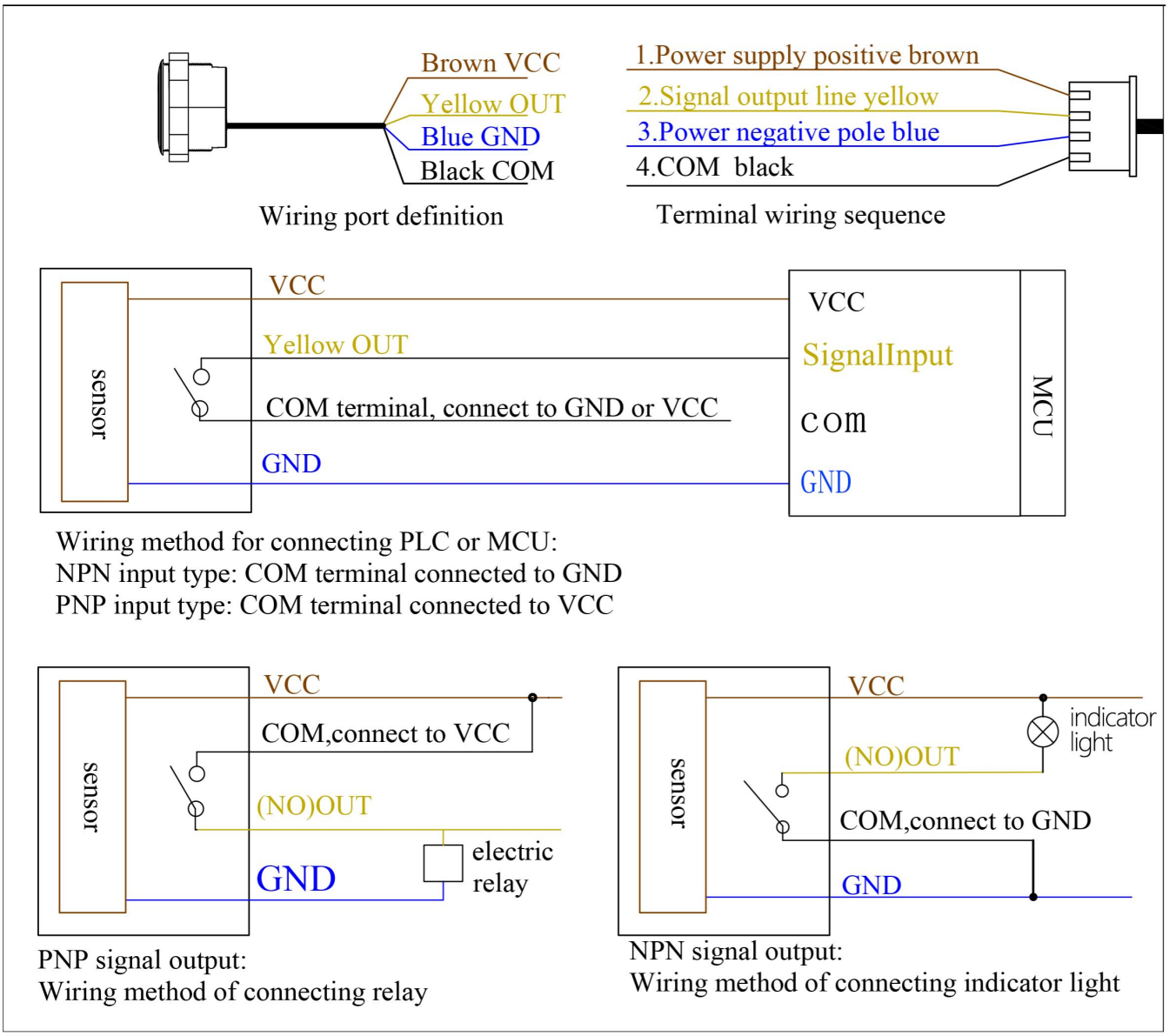
Did not sensing the object, the transistor conduction output low level, relay power suction;

When the output mode is the reverse output

Did not sense the object when the transistor output output high level, relay power does not absorb;

Ining the object when the transistor conduction output low level, relay power suction;

3. Simplified schematic diagram of the output wiring principle of XKC-LD500B- -M-NO relay



Operating principle of relay point NO output:

1). When the black line is connected to the VCC:

When sensing the object, the relay is closed, the relay NO point conduction, and the output VCC voltage;

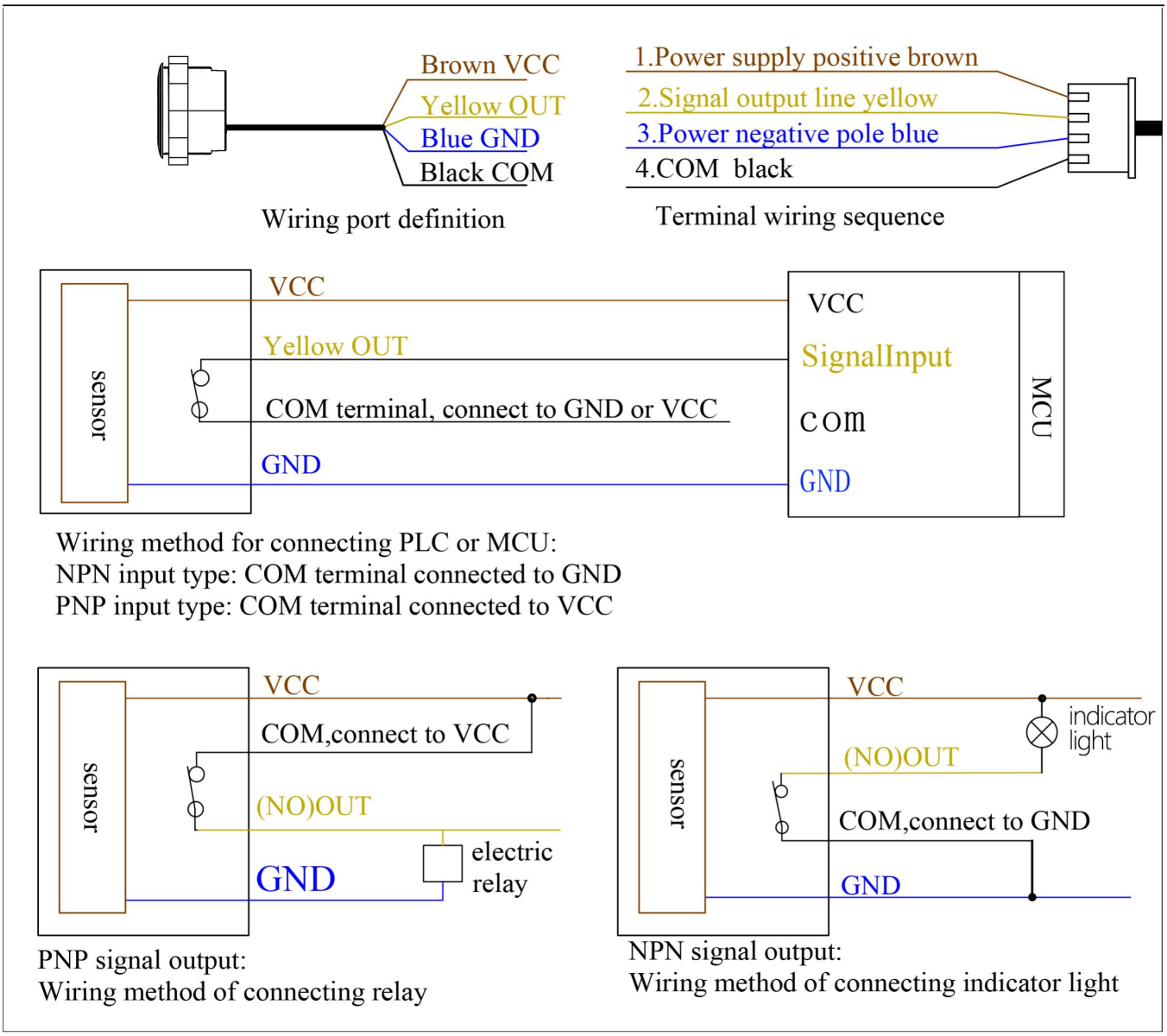
When the relay is not disconnected to the object, the relay NO point is disconnected;

2). When the black line connects to the GND:

When sensing the object, the relay is closed, the relay NO point conduction, and the output GND voltage;

When the relay is not disconnected to the object, the relay NO point is disconnected;

4. Simplified output wiring principle of XKC-LD500B- -M-NC relay



Operating principle of relay NC point output:

1). When the black line is connected to the VCC:

When the object is induced, the relay is closed, and the relay NC point is disconnected;

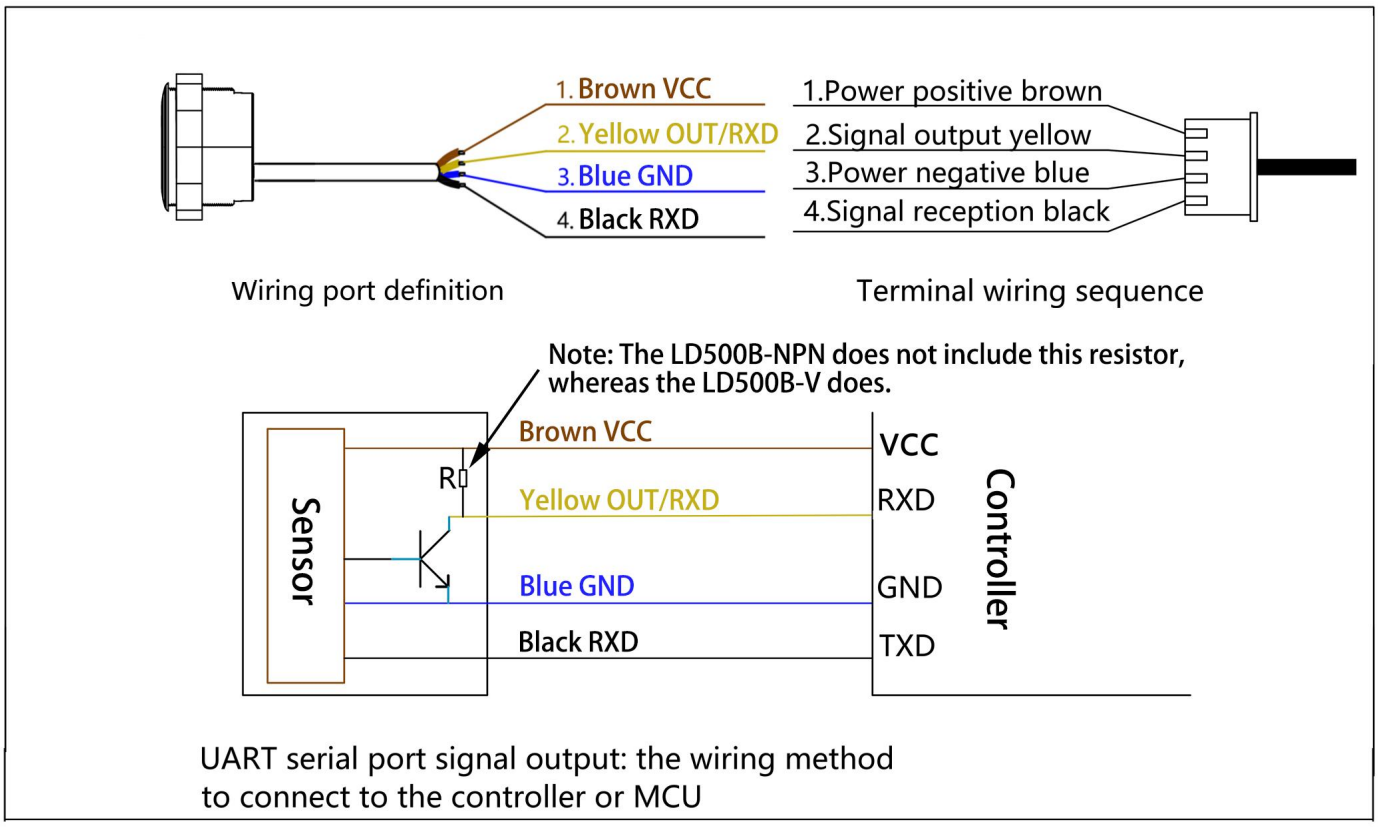
When the object is not induced, the relay is disconnected, the relay NC point is on, and the output VCC voltage;

2). When the black line connects to the GND:

When the relay is closed, the relay NC point O is disconnected;

When the object is not induced, the relay is disconnected, the relay NC point conduction, the output GND voltage;

5. Simplified schematic diagram of XKC-LD500B-UART serial port output wiring principle



15. Communication protocol

1.1 Hardware uses uart.
Brown (VCC), yellow (TXD, 5V pin, unprotected output) blue (GND), black (RXD, 5V pin, unprotected input)
1. Power supply is 9~24V
2. Cross a drag resistance of about 1K between the customer MCU power supply and the OUTPUT (yellow line).

1.2 Default configuration of the serial port:
Baud rate: 9,600
Data bit: 8
Check position: no
Stop position: 1

1.3 Serial port receiving data format: AA LEN COMM DATA SUM
Head: 0 XAA
Length (LEN): 1 byte (number of LEN to SUM bytes)
Functions (COMM): (1 byte)
Data (DATA): DATA, high bytes first, low bytes back
Sum check (SUM): sum of prefix to data 8 bits (1 byte)

- Function code description:
  0X10 indicates the gear bit setting.
  0X20 indicates the query output state.
  0X30 indicates restored factory settings (default median)

- data specification:
  Sequence Settings:
  0X01-indicates the lower grade
  0X02-indicates Midrange (default)
  0X03-means upscale
  0X04-means super scale
  Query the device status:
  0X00-No inductive output
  0X01-With an inductive output

- **Return the ACK information: Data format is consistent with the received format**
  Function code: received function code + 0x80.
  Example 1: Set the gear to 1 gear:
  Received data: AA 04 10 01 BF
  Return data: AA 04 90 01 3F
  Example 2: Query the output status:
  Received data: AA 03 20 CD

16. Product warranty terms and instructions

(1) Warranty service

1. Warranty maintenance: from the date of purchase, the product host is free of charge. The Company has the right to decide to repair or replace the faulty parts. If the replacement parts are replaced, the replacement parts may be new equipment or repair goods with the same category, function and quality. The replaced faulty parts shall be owned by the Company; the resale and maintenance of the products shall not affect the warranty period, and the products repaired or replaced shall continue to enjoy the original remaining warranty period; if less than three months after the end of the warranty period, the repaired or replaced products shall be repaired by customers.

2. Loss upon arrival (DOA) replacement: from the date of purchase, you can enjoy within 7 days of free replacement service of the equipment. Products with the following problems are defined as DOA equipment after the first unpacking; part or all of the components after the first opening (surface scratches or other defects that do not affect the function of the equipment are not included); other hardware faults identified by remote or local inspection by the engineers of the Company.

(2) Limtions of application of warranty

The Company does not assume any warranty liability for:

1. The product exceeds the warranty period; the product surface is easily broken and damaged; the product appearance is seriously damaged, installation / use under abnormal environment, unauthorized disassembly, repair / modification, external power supply injury and other abnormal damage;

2. Damage caused by the wrong installation and use of the product if the user fails to follow the requirements of the manual;

3. Damage caused by natural disasters and man-made negligence (fire, lightning strike, water flooding, impact, etc.).

(3) The accessories and consumables are not covered by the warranty.

(4) Non-free warranty service

Within two years of the purchase of the product, for the products (including parts) not under warranty, you can choose the paid maintenance service (free of labor cost), and we will charge the transportation cost of the parts and accessories of the repair product according to the actual situation.

(5) Access to warranty services

Recommend you to contact the dealer to buy this product for warranty service, warranty please show valid warranty card (dealer stamp effect) or purchase invoice / receipt: if not show, the product free warranty period to product 12 months from the date of delivery, the latest DOA application period, to 7 days from the date of delivery.

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5. Not all models are available in all countries

Please keep this instruction properly. Before using the product, please read the manual carefully. When using the product, please be sure to follow the manual. The company will not be responsible for any injuries and accidents caused by it.

(7) Environmental protection

The product meets the design requirements for environmental protection, and the storage, use and disposal of the product shall be conducted in accordance with the relevant national laws and regulations.

17. Manual version

version number	date of issue
V10	2025-03-18