Manuals+ — User Manuals Simplified.

PRO RANGE
KL800-PUB Laser
Ranging Sensor

PRO RANGE KL800-PUB Laser Ranging Sensor Instruction Manual

Contents

PRO RANGE KL800-PUB Laser Ranging Sensor

Specifications

- Working voltage: DC 5V-24V
- Induced effective distance: Varies based on model
- Induction accuracy: High precision
- Short-circuit protection: Available
- Load current peak point current: Up to 300mA

Product Usage Instructions

Installation
Mount the PRO RANGE-KL800 sensor securely in the desired location using appropriate mounting hardware.

Power Connection
Connect the sensor to a power source within the specified voltage range (DC 5V-24V).

Output Method Configuration
Determine the required output method based on your application needs and configure the sensor accordingly.

Calibration
Calibrate the sensor according to your specific distance measurement requirements.

Testing and Validation
Test the sensor in different environmental conditions to ensure accurate and reliable distance measurements.

Frequently Asked Questions (FAQ)

Q: What is the maximum load current supported by the sensor?}
A: The sensor can directly control a current within 300mA.

Q: How can I configure the output method of the sensor?
A: The output method can be configured based on the specific model selected. Refer to the product selection table for available options and their descriptions.

Q: Can the sensor be used in outdoor environments?
A: The sensor is designed to function in various application environments, but specific operating ambient temperature and waterproof classification details should be considered for outdoor use.

Summary

PRO RANGE-KL800 is a single-point ranging sensor based on the ToF principle. The product has a variety of application environments and targets. With the unique optical and electrical design, it can achieve stable, accurate and highly sensitive distance measurement in a complex environment.
When the measured object enters the Fov of the sensor; the sensor will judge whether the measured object enters the induction interval set by the sensor internal system according to the distance measured in real time; if the measured object enters the induction interval behind the sensor, when the indicator light of the sensor leaves the induction interval, the indicator light goes off; the sensor output mode includes UART serial port, high and low level , NPN or relay, which can be selected.

Functional characteristics

1. Strong anti-interference ability, which can be used in the sun.
2. Intelligent induction of non-contact switch, safety and health.
3. The induction angle is small.
4. Small in size and easy to install.
5. A variety of ways to output, simple and easy to use.
6. High protection level, with overcurrent, overvoltage, anti-back connection and other protection circuit.
7. In the indoor environment, the real-time measurement distance is up to 8 meters.
8. Multi-layer filter cover, with more stable induction.

Applied range

1. Intelligent induction sanitary ware, such as: faucet induction, urine and feces bucket automatic flushing, automatic drying phone, etc.
2. Home security, such as: burglar, automatic doorbell, stair aisle induction, TV close watch TV reminder, etc.
3. Intelligent detection, intelligent control, such as: automatic door, advertising light box, automatic trash can, etc.
4. Identification of robots, drones and other obstacles.
5. Real-time detection distance of industrial automation equipment.

Performance parameter table

project name	parameter
working voltage	DC 5~24V
Induced effective distance	0.2m~8m
Induction accuracy	±6cm 0.2m~3m ±2% 3m~8m
wavelength	The 860-nm laser emitter
Launch Angle	2 Degrees
short-circuit protection	After 1A, the output is turned off
load current	300mA
peak point current	≤120mA
operating ambient temperature	-20 60℃
Storage temperature	-20 85℃
wire length	50cm (± 10MM) (batch customizable)
material quality	Shell: PC-V0 fireproof material
classification of waterproof	IP65
Output method	UART serial port, NPN, High and Low Level, ~~relay, RS485~~

Product selection

order number	model	Output method①
1	PRO RANGE-KL800-NPN - NO	NPN collector open circuit output (normally open) DC 5V-24V
2	PRO RANGE-KL800-NPN - NC	NPN collector open circuit output (normally closed) DC 5V -24V
3	PRO RANGE-KL800-V	High and low level signal output 5V-24V
4	PRO RANGE-KL800-UART	UART, serial port output
5	PRO RANGE-KL800-M-NO	Relay normally open 5V-24V output
6	PRO RANGE-KL800-M-NC	Relay normally closed 5V-24V output
7	~~PRO RANGE-KL800-RS485~~	~~485 Communication mode②~~

Note:

1. The output mode is one sensor and can only have one output mode at the same time.
2. Grey model is not on the shelves.

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.

Switching volume output: the signal sent by the switching volume sensor is the contact signal, there are 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 output: Laser switch (except XKC-KL 800-V) with UART configuration function. Users can configure relevant parameters through the UART communication protocol, or specify the factory default configuration value. The default configuration value of PRO RANGE is shown in the following table.

Laser switch UART factory default parameter configuration table:

CI	Windows default	explain
Baud rate	1=9600bps	0-9,2400bps-128000bps (0-6,9600bps-115200bps) (see Porter rate configuration table for details)
device address	0	0-65534 (65535 for radio address)
Calibration distance value	500	20-8000 20-8000mm
Upload mode	0= Automatic upload	0= automatic upload, 1= manual query (1 = NPN mode, 2=V mode, 4= manual query)
Upload interval	1	Value range: 1-100 (corresponding to 100ms-10s)
LED pattern	0= Light up when there is an induction	0= light on when there is induction, 1= turn off when there is induction

The laser switch LED indicator table

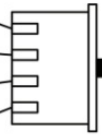| phenomenon	LED indicate	Flashing Parameters (on / off)
Is being calibrated	quick flashing	100ms/100ms
Object detected	Often bright	
No objects were detected	Often destroyed	

Wiring principle

1. Schematic diagram of simplifying the output wiring principle of PRO RANGE-KL800-NPN-NO

2. Schematic diagram of simplifying the output wiring principle of PRO RANGE-KL800-NPN-NC
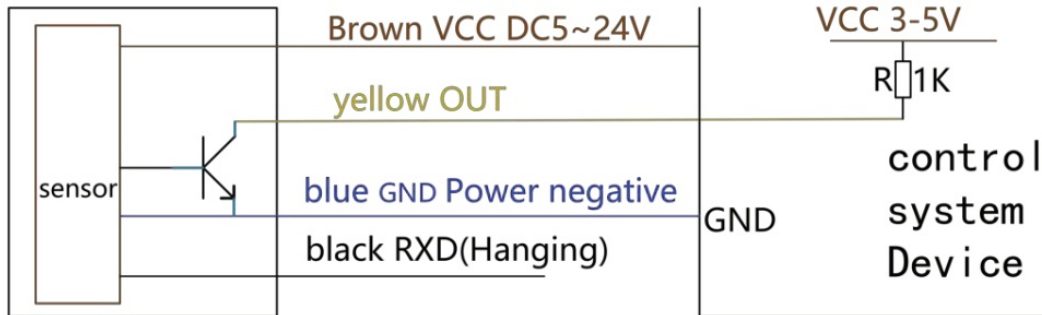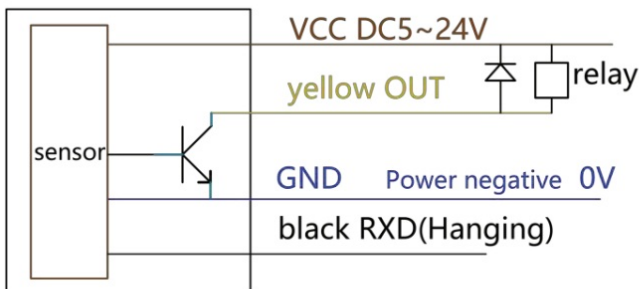
Brown VCC
yellow OUT
blue GND
black RXD

Wiring port definition

1.Power positive brown
2.Signal output yellow
3.Power negative blue
4.Signal reception black

Terminal wiring sequence

Brown VCC DC5~24V
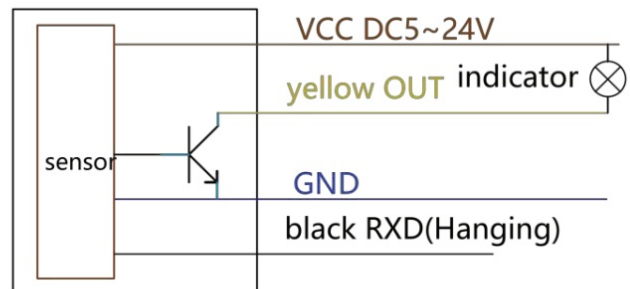yellow OUT
blue GND Power negative
black RXD(Hanging)

sensor

VCC 3-5V
R 1K
control system Device
GND

NPN signal output: wiring method to connect to controller or MCU

VCC DC5~24V
yellow OUT   relay
GND   Power negative 0V
black RXD(Hanging)

sensor

NPN signal output:
Wiring method of connecting relay

VCC DC5~24V
yellow OUT indicator
GND
black RXD(Hanging)

sensor

NPN signal output:
Wiring method for connecting LED indicator

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

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;

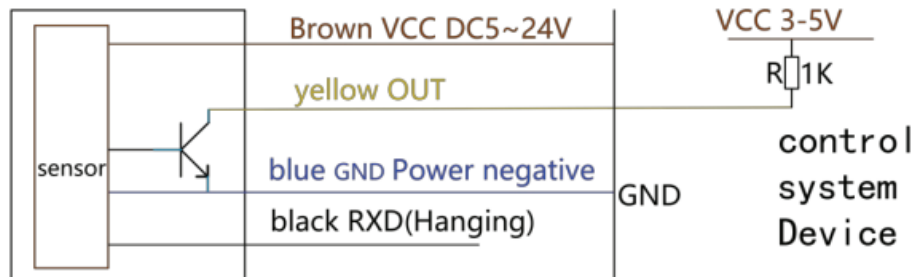3. Simplified schematic diagram of the wiring principle of PRO RANGE-KL800-V high and low level output
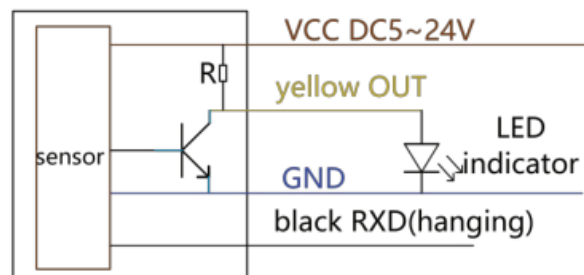
Brown VCC
yellow OUT
blue GND
black RXD

Wiring port definition

1. Power positive brown
2. Signal output yellow
3. Power negative blue
4. Signal reception black

Terminal wiring sequence

sensor

Brown VCC DC5~24V
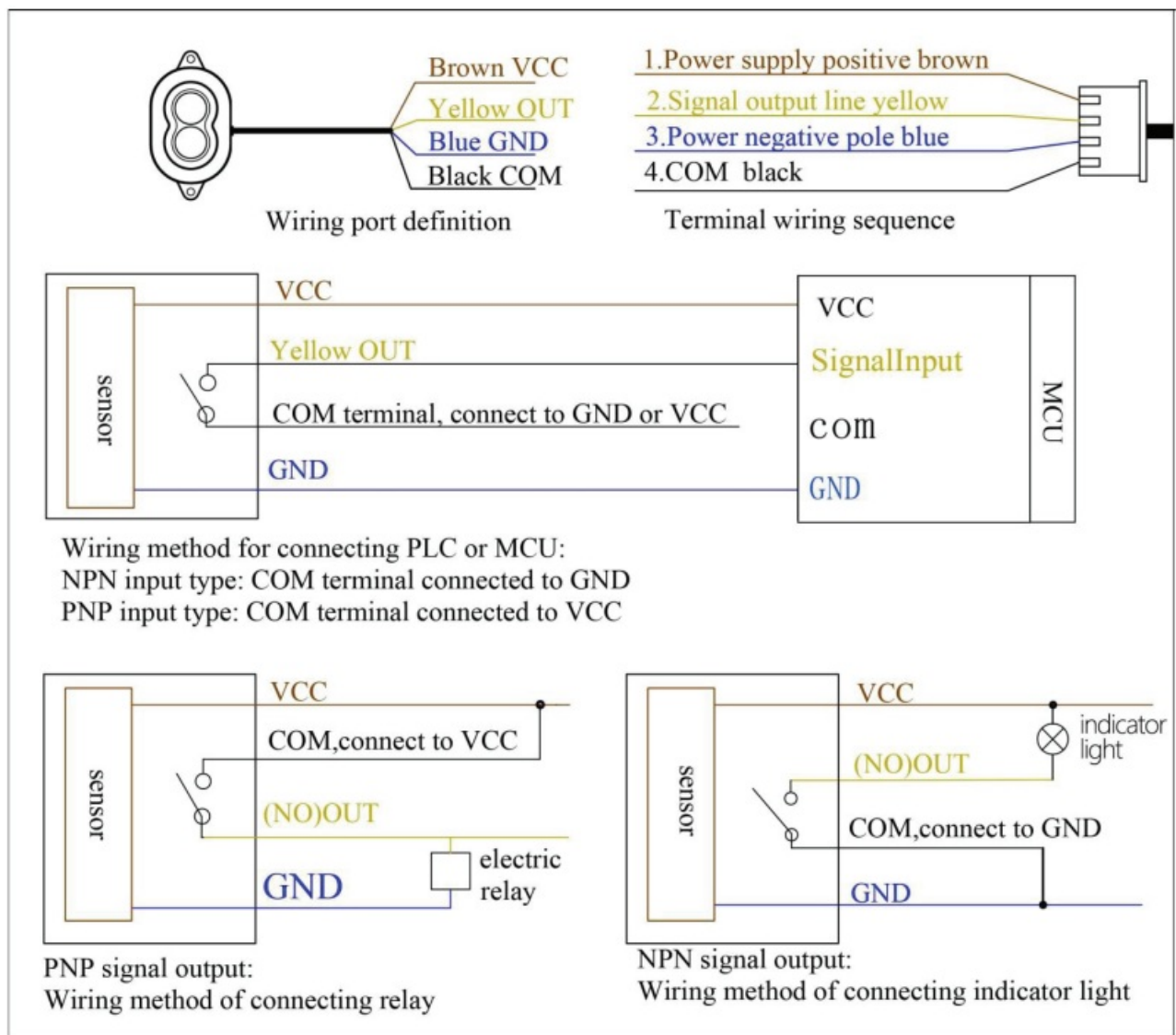**yellow OUT**
blue GND **Power negative**
black RXD(Hanging)

VCC 3-5V
R 1K

GND

control
system
Device

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

sensor

R

VCC DC5~24V
yellow OUT

GND

LED
indicator

black RXD(hanging)

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 sensing the object, the transistor output output high level, the relay power does not absorb; Did not sensing the object, the transistor conduction output low level, relay power suction;
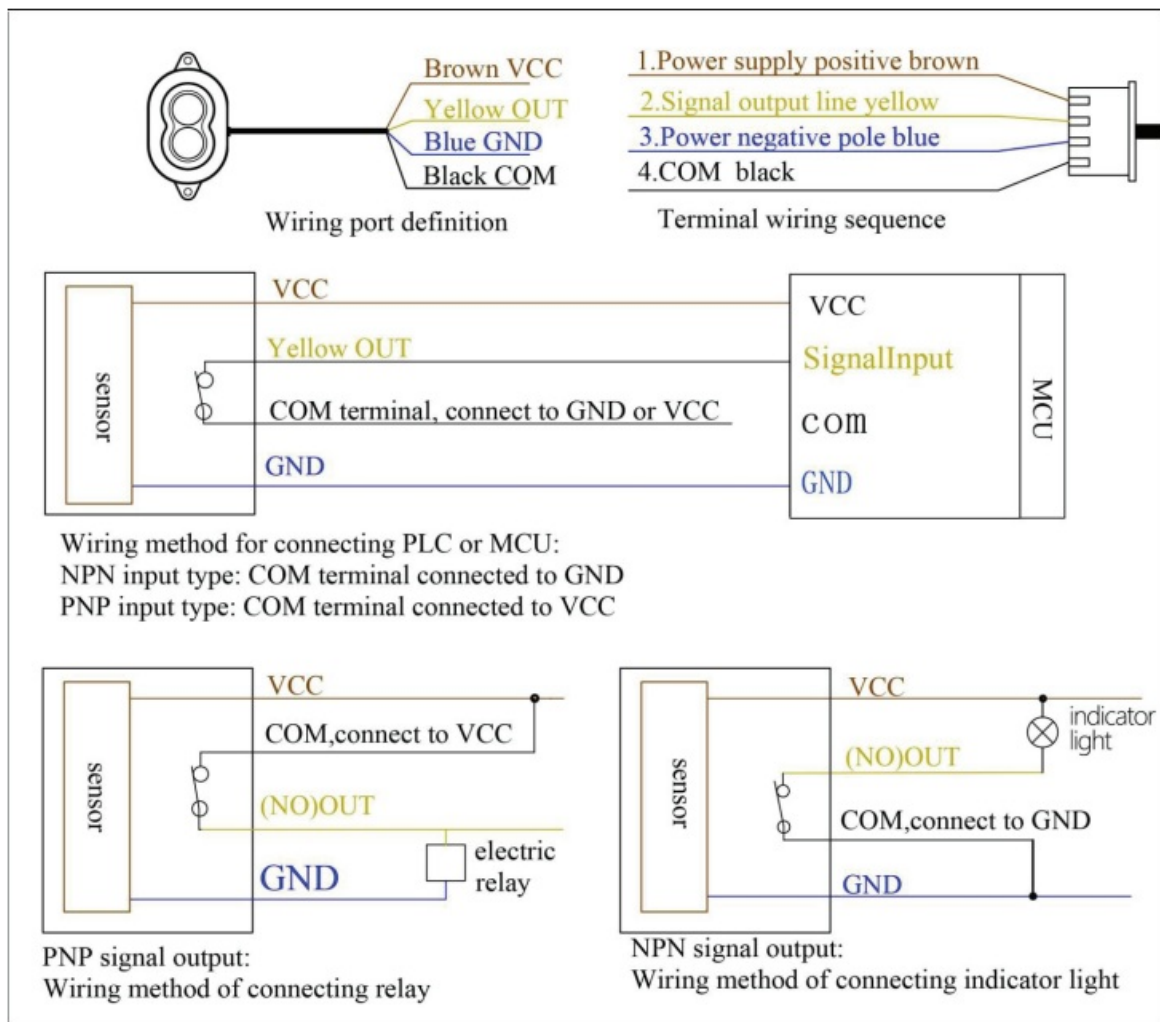
4. Simplified schematic diagram of the output wiring principle of PRO RANGE-KL800-M-NO relay

Wiring port definition

Terminal wiring sequence

Brown VCC
Yellow OUT
Blue GND
Black COM

1.Power supply positive brown
2.Signal output line yellow
3.Power negative pole blue
4.COM black

VCC
Yellow OUT
COM terminal, connect to GND or VCC
GND

VCC
SignalInput
com
GND

Wiring method for connecting PLC or MCU:
NPN input type: COM terminal connected to GND
PNP input type: COM terminal connected to VCC

VCC
COM,connect to VCC
(NO)OUT
GND
electric relay

PNP signal output:
Wiring method of connecting relay

VCC
(NO)OUT
COM,connect to GND
GND
indicator light

NPN signal output:
Wiring method of connecting indicator light

Operating principle of the relay NO point 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 wire 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;

5. Schematic diagram of simplified output wiring principle of PRO RANGE-KL800-M-NC relay

Wiring port definition

Terminal wiring sequence

Brown VCC
Yellow OUT
Blue GND
Black COM

1.Power supply positive brown
2.Signal output line yellow
3.Power negative pole blue
4.COM black

Wiring method for connecting PLC or MCU:
NPN input type: COM terminal connected to GND
PNP input type: COM terminal connected to VCC

PNP signal output:
Wiring method of connecting relay

NPN signal output:
Wiring method of connecting indicator light

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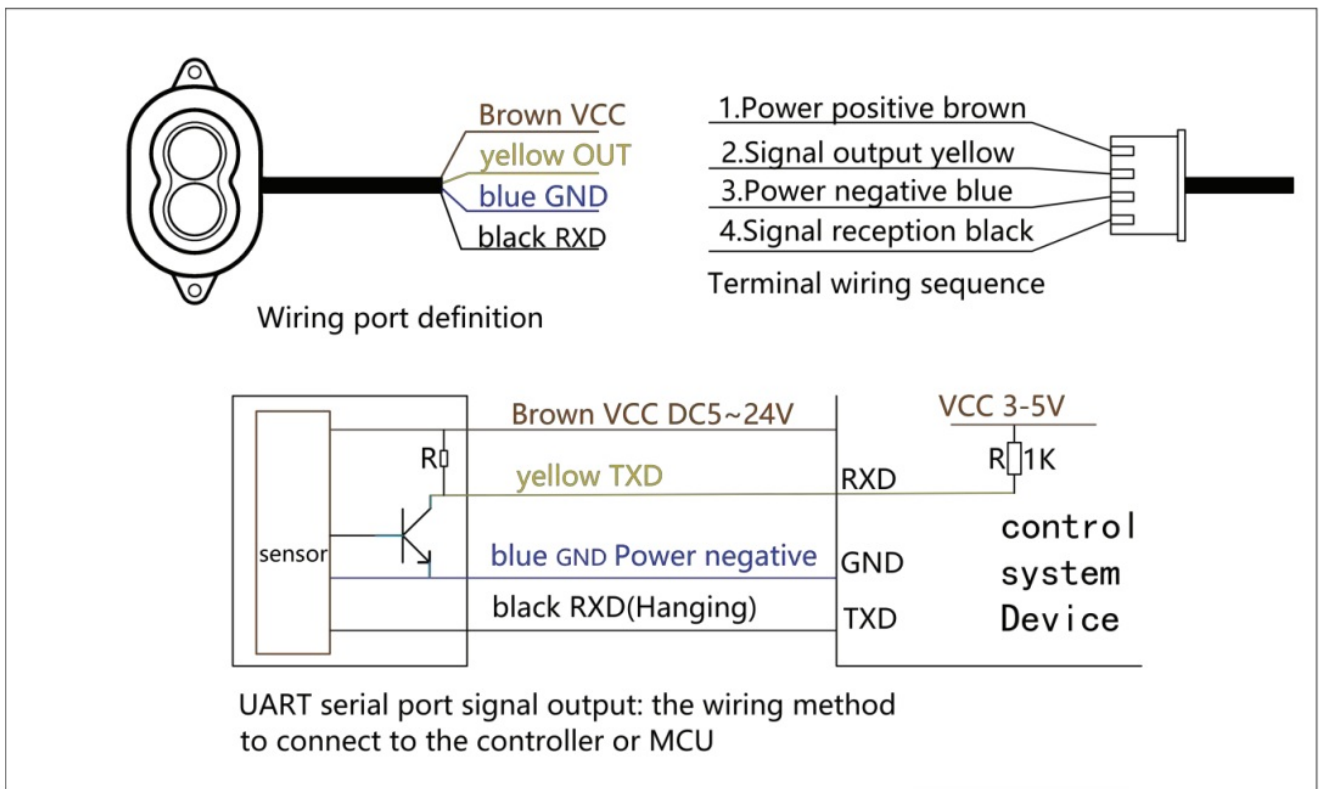
   When the object is not induced, the relay is disconnected, the relay NC point is on, and the output VCC voltage;

2. **When the black wire connects to the GND:**

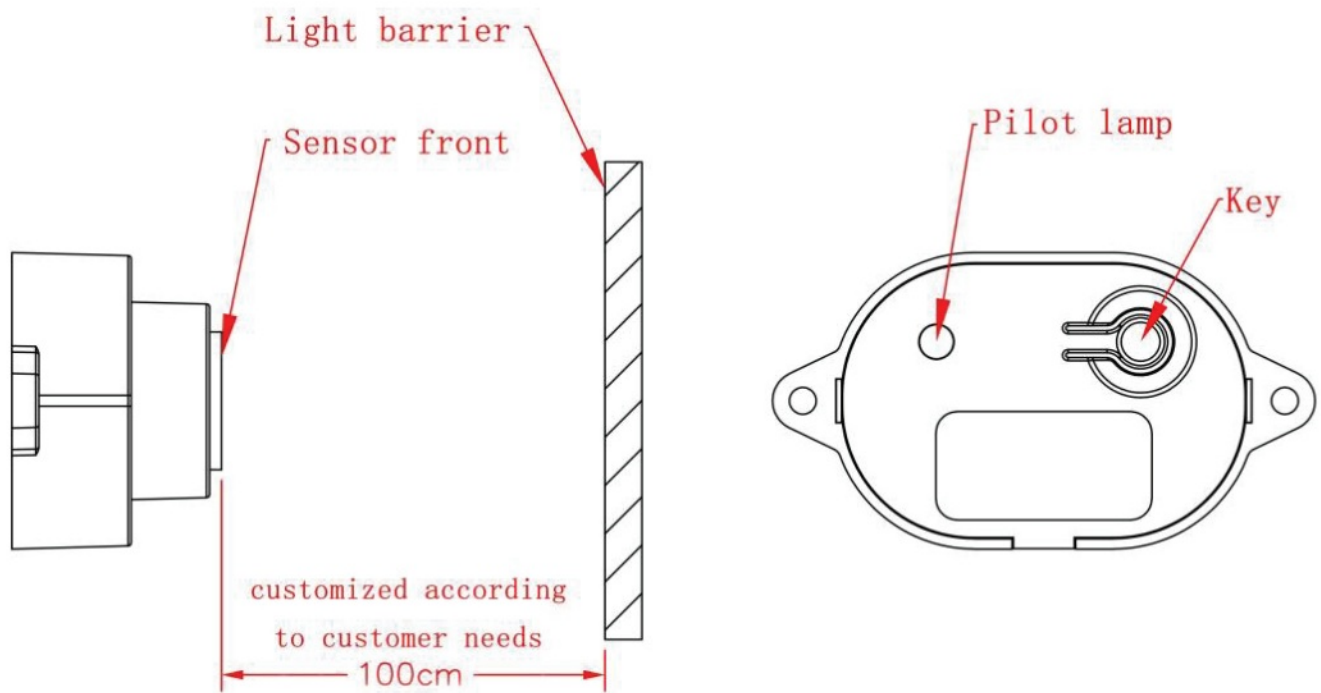   When the relay is closed, the relay NC point O is disconnected;

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

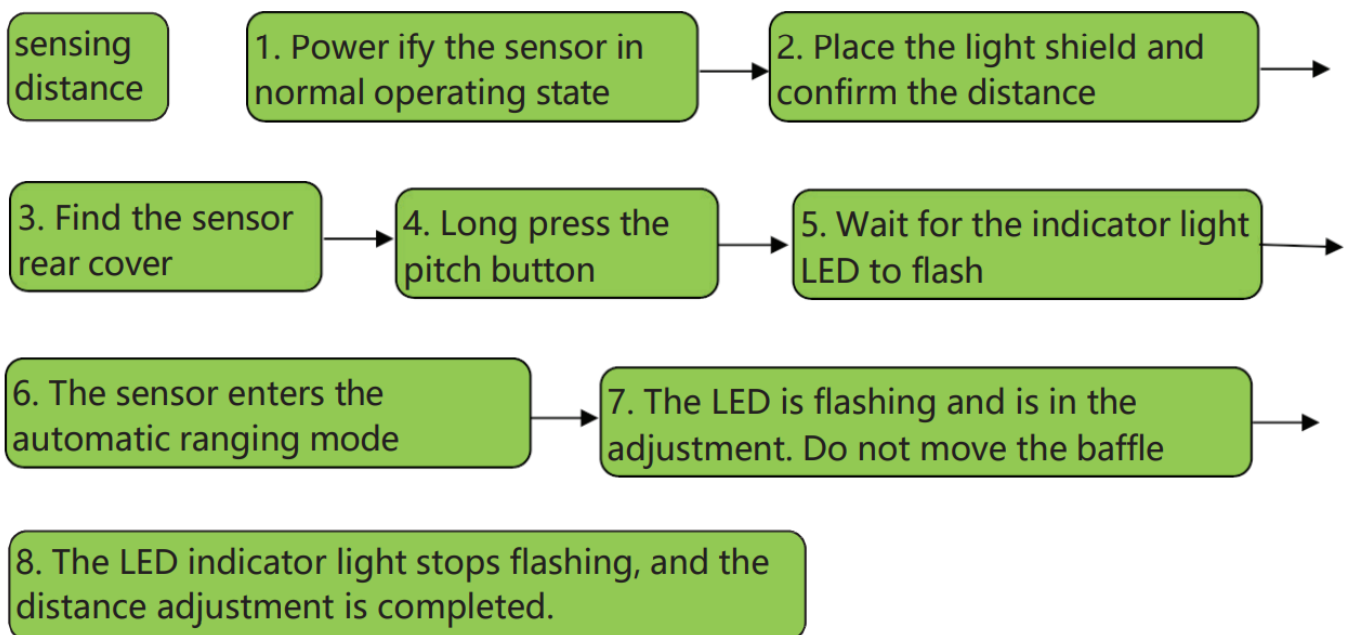6. Simplified schematic diagram of PRO RANGE-KL 800-UART serial port output wiring principle
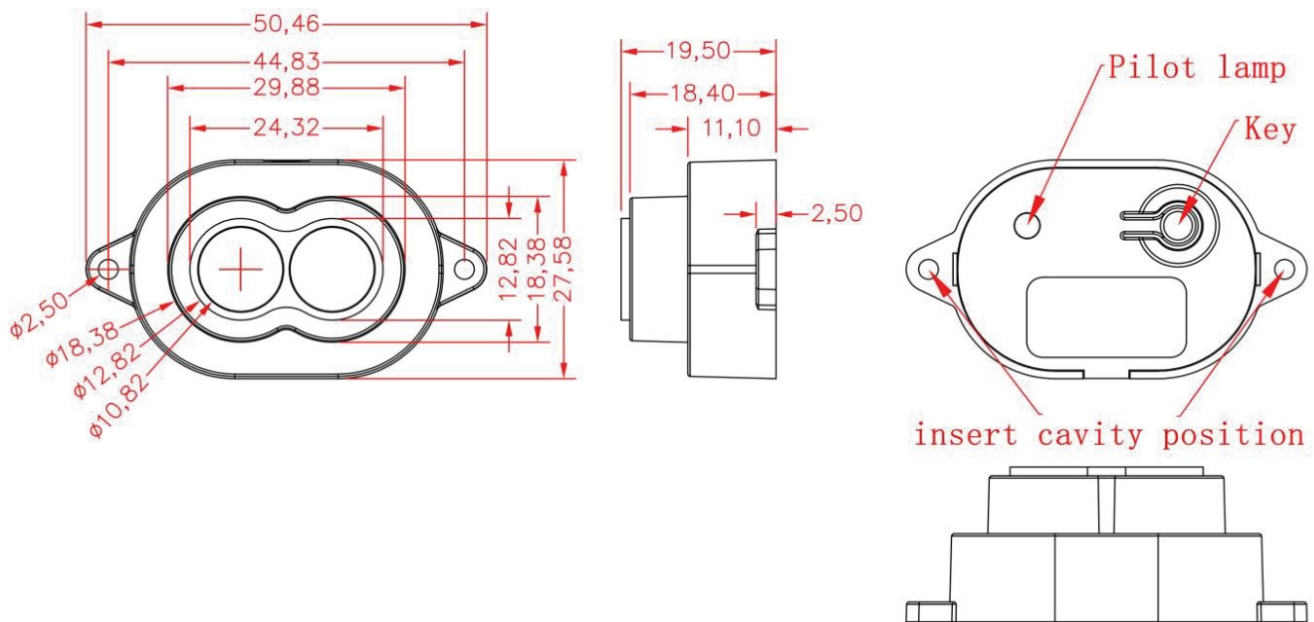
Wiring port definition

Brown VCC
yellow OUT
blue GND
black RXD

1.Power positive brown
2.Signal output yellow
3.Power negative blue
4.Signal reception black

Terminal wiring sequence

sensor

Brown VCC DC5~24V
yellow TXD
blue GND Power negative
black RXD(Hanging)

R

RXD
GND
TXD

VCC 3-5V
R 1K

control
system
Device

UART serial port signal output: the wiring method
to connect to the controller or MCU

Induction distance adjustment

1. Place approximately 60cm * 60cm kraft cardboard in the range of 100 c m(0.2m ~8m in front of the sensor according to user requirements).
2. The sensor is power-supply switched on.
3. Find the sensor button, and then hold down the button.
4. About 2-3 seconds after the indicator light is on, release the button and start entering the automatic adjustment sensing distance mode. The sensor and cardboard remain motionless, with no other objects in the middle. After waiting for about 2 seconds, the indicator light stops flashing to automatically save the data; automatically return to normal operation mode. The adjustment distance is completed.

Light barrier

Sensor front

customized according
to customer needs

100cm

Pilot lamp

Key

Induction distance adjustment process

| sensing distance | 1. Power ify the sensor in normal operating state | 2. Place the light shield and confirm the distance |

| 3. Find the sensor rear cover | 4. Long press the pitch button | 5. Wait for the indicator light LED to flash |

| 6. The sensor enters the automatic ranging mode | 7. The LED is flashing and is in the adjustment. Do not move the baffle |

| 8. The LED indicator light stops flashing, and the distance adjustment is completed. |

Product dimensions and specifications

Installation method

Put the sensor induction surface on the person or object in the detection area, and tighten the sensor installation hole with the M2 screw to ensure that the sensor installation is stable and not shaking.

Note: Installation hole dimensions are shown in "Product Size Specification"

Ranging characteristics

- The KL 800 is 0-20cm, and the data in this range is not credible.
- Ability to detect black (10% reflectivity) targets, with a measurement range of 0.2-2.5m.
- Ability to detect white (90% reflectivity) targets with a measurement range of 0.2-8m.
- The data is stable and reliable only when the measured target side length is greater than or equal to, the effective range side length. "Effective distance measuring side length"
- Deided by the field of view (the field of view generally refers to the receiving Angle and the emission Angle), the calculation formula is: $d = 2 * D \cdot \tan\beta$
- Where d represents the effective ranging side length, D represents the detection distance, and β is the receiving half angle 1° of KL 800, the general effective ranging

The corresponding relationship between side length and detection distance is shown in the table below:

detection range	1m	2m	3m	4m	5m	6m	7m	8m
Effective side long	3.5cm	7cm	10.5cm	14cm	17.5cm	21cm	24.5cm	28cm

Communication protocol

Hardware uses uart.

Brown (VCC), yellow (signal output) blue (GND), Black (RXD)

Except for PRO RANGE-KL 800-V and PRO RANGE-KL 800-M, our laser switch products can do UART

applications, pay attention to user needs:

1. Power supply is 5~24V
2. Cross a drag resistance of about 1K between the customer MCU power supply and the OUTPUT (yellow line).

Default configuration of the serial port:

- Baud rate: 9,600
- Data bit: 8
- Check position: no
- Stop position: 1

Default sensor upload data: (data format: hexadecimal)

data format	data format														
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	Head	Len	Code	Address		Dis1		Dis2		Strength		Temp		Class	Check out (XOR 8)
Upload format	AA	15	10	00	00	01	F4	01	F4	23	28	00	19	00	XOR

Paraphrase:

1. Head: fix the head frame
2. Len: byte length (length of header frame to check bit)
3. Code: command code
   - 10: Data upload code
   - 0F: Modify equipment address 0-65534 (65535 for broadcast address)
   - 08: Modify the automatic upload interval
   - 06: Modify the Porter rate
   - 05: Output the modified function code
4. Address: Device address
5. Dis 1: Measured distance value of the sensor (dynamic distance value)
6. Dis 2: Measured distance value of the sensor (stable distance value)
7. Strength: Sensor signal receiving strength
8. Temp: Sensor temperature
9. Class: Sensor operation level

Functional instructions

write address	data format								
	0	1	2	3	4	5	6	7	8
	Head	Len	Code	Address		Data1	Data2	(reply)RES	Check out (XOR8)
Send command	AA	08	0F	00	00	00	01	00	XOR
Successful return	AA	08	0F	00	01	01	00	FF	XOR8

The above command changes the 0x0000 address to 0x0001
Parameter Description: 0~65534 (address range)

Modify the Port er rate	data format								
	0	1	2	3	4	5	6	7	8
	Head	Len	Code	Address		Data1	Data2	(reply)RES	Check out (XOR 8)
Send command	AA	08	06	00	00	05	00	00	XOR
Successful return	AA	08	06	00	00	05	00	FF	XOR8

The above command changes the baud rate to 19,200 bps parameter declaration: 0= 9600bps

1. = 2400bps
2. = 19200bps
3. = 38400bps
4. = 57600bps
5. = 115200bps

revise Upload mode	data format								
	0	1	2	3	4	5	6	7	8
	Head	Len	Code	Address		Data1	Data2	(reply)RES	Check out (XOR8)
Send command	AA	08	05	00	00	04	00	00	XOR
Successful return	AA	08	05	00	00	04	00	FF	XOR

The above command changes the upload mode to: (manual query mode) parameter declaration:

Byte 5:

00: Serial port automatic upload mode (uart) 01: NPN / relay mode (induction on, not off)

02: V / Relay mode (with induction off / high level, no induction on / low level) 04: Serial port manual upload mode (uart)

Note: NPN modification returned 00

Byte 6:

- 00: LED positive output (induction light, no induction out)
- 01: LED reverse output (with induction out, no induction light)

Note: The modification returns the data bit 00 00

Modify the automatic Upload interval	data format								
	1	2	3	4	5	6	7	8	9
	Head	Len	Code	Address		Data1	Data2	(reply)RES	Check out (XOR8)
Send command	AA	08	08	00	00	02	00	00	XOR
Successful return	AA	08	08	00	00	02	00	FF	XOR

The above command changes the automatic upload interval to 200ms

Parameter Description: 1-100 (corresponding to 100ms-10s)

Troubleshooting Guide

question	LED indicate	handle
Output short circuit	quick flashing	Check that the output current is not greater than 1A
Product failure	Pulse	Contact the agent to return and exchange
Mode setting error	Often bright not destroyed Often destroyed not bright Output reverse	Check the LED mode, relay mode, if the factory is not normal, please contact the agent to return

Notes for use

1. The receiving device is disturbed by strong light (ordinary indoor light is not affected, when the light is too strong, the sensitivity is reduced and the distance becomes close). When installation, try to avoid direct light on the probe to make the induction distance close and affect the function.
2. During the installation, avoid working in the environment with high dust concentration (because the high concentration of dust is equivalent to inductive objects, which will make the sensor work by mistake) to avoid misoperation.

Product warranty terms and description

1. **Warranty service**
    1. Warranty maintenance: from the date of purchase, the product host is free for one year. The Company has the right to decide to repair or replace the faulty parts. If the replacement parts, 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 the repair or replacement parts shall be guaranteed for three months from the end of the warranty period; all the warranty service of the Company shall be sent to the customer.
    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: inconsistent; part or all of the components of the product are not used normally (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. **Limitans 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 when 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 to 12 months from the date of delivery, the latest DOA application period, to 7 days from the date of delivery.

6. **Statement**

   1. The copyright of this manual belongs to Shenzhen Pro Range Technology Co., LTD. (Pro Range) and its licensors, and Shenzhen Pro Range Technology Co., LTD. (Pro Range) reserves all rights.

   2. Without the written permission of the Company, no unit or individual shall copy or copy part or all of the contents of this manual, and shall not disseminate them in any form.

   3. Customers agree that the design and production purposes of the Company's products do not involve their use in the products related to life security or in other systems or products used in other dangerous activities or in the environment. Personal injury, property or environmental damage due to product failure (collectively referred to as high-risk activities). The Company shall not guarantee the use of our products in high-risk activities and shall not be liable to customers or a third party.

   4. The contents of this manual may be changed due to the product version upgrade or other reasons. Pro Range reserves the right to modify the contents of this manual without any notice or prompt. This manual is only used as a guide for use, and Pro Range tries its best to provide accurate information in this manual. However, Pro Range does not ensure that the contents of the manual are completely free of errors, and all statements, information and suggestions in this manual do not constitute any express or implied guarantee.

   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.

Manual version

version number	date of issue
V13	2024-06-12

Documents / Resources

PRO RANGE KL800-PUB Laser Ranging Sensor [pdf] Instruction Manual
KL800-PUB Laser Ranging Sensor, KL800-PUB, Laser Ranging Sensor, Ranging Sensor, Sensor

References

- **User Manual**