SAFETY MEASUREMENT LIGHT CURTAIN

Technology is for Development As Quality is for Survival

Industrial Safety Expert
--- Professional industrial security solutions provider, security with technology, with professionalism and with responsibility

Nanjing KJT Electric Co.,LTD.

Address: Haoyue Science and Technology Park, No.1 FangYuanZhong Road Jiangning District,Nanjing City,Jiangsu Province, China 211102

Phone: +86-18912913731

Tel: +86-25-65019201

Fax: +86-25-87168200

Web: kjt-sensor.com

Email: info@kjtsensor.com; Daisy@kjtsensor.com; David@kjtsensor.com

凯基特电气

Integrity, Exploit, Innvation

Nanjing KJT electric co., LTD. Is a high-tech enterprise specializing in the production of sensors, electronic appliances and research and development. It's leading products proximity sensors, photoelectric sensor, gear speed sensor, analog sensor, displacement sensor, pressure sensor, cold and hot metal detector, electronic CAM controller, and other products has been widely used in machinery, metallurgy, textile, electric power, automobile, light industry and other industries, the enterprise passed the "IS09001" ," 3C", "CE" quality management system certification.

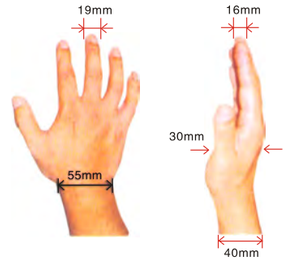
The enterprise spirit of "keep improving, pragmatic and efficient" drives us to make continuous technological progress. The complete quality management system and innovative research and development technology provide us with perfect quality assurance for your products.

IS09001:2000

KJTDQ Industrial Safety Expert — Safety Light Curtain

KJT Series Safety Light Curtain

Resolution Ratio



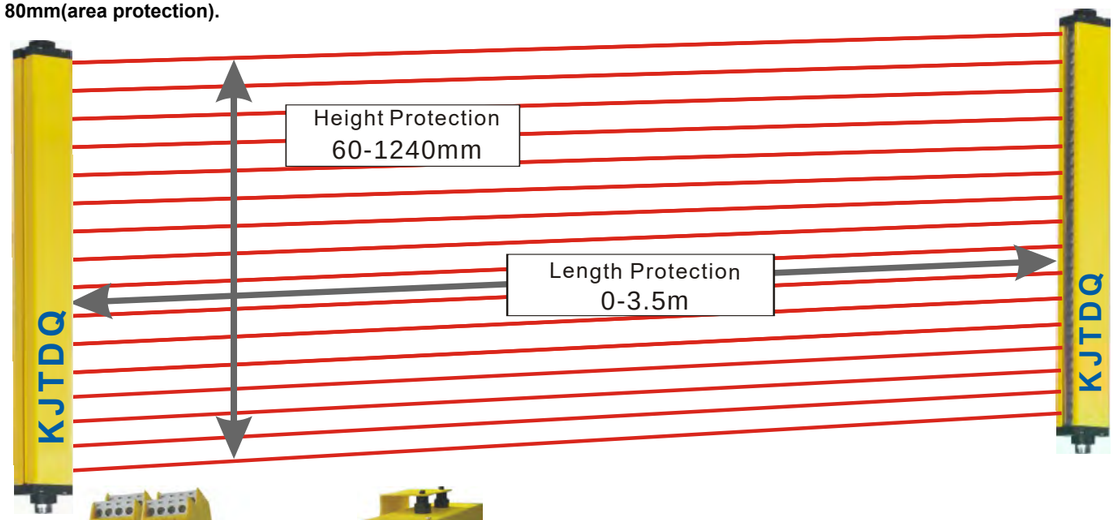
The optical axis spacing of the safety light curtain sensor is respectively 10mm (finger protection), 20mm (palm protection), 30mm and 40mm (wrist and arm protection), and 80mm(area protection).

Safety Light Curtain

Safety light curtain sensor uses non-contact detection method. KJT safety light curtain sensor adopts miniaturization design, exquisite structure, can be installed in small space, used for small and medium-sized dangerous machinery and equipment and areas. The light curtain is of opposite type, with an optical axis spacing of 20mm and 40mm.
KJTS safety light curtain sensor adopts high quality protective structure and vibration resistance, which can be used in large and heavy dangerous machinery, equipment and areas and other harsh working environment.
Optical axis spacing is 10mm, 20mm, 30mm, 40mm, 80mm.

Relationship between optical axis spacing and detection accuracy

Optical axis spacing	10mm	20mm	30mm	40mm	80mm
Accuracy	15mm	30mm	40mm	50mm	100mm



KJT Safety Relay

KJT–2P

KJT–1A/1D

KJT–1

Safety Light Curtain Controller, Safety Relay

Safety light curtain controller and safety relay can ensure the output of safety control signal to the controlled equipment.
KJT safety light curtain controller uses one type: KJT-1A /1D built-in controller.
KJTS safety light curtain sensor uses two types: KJT-1 built-in controller and KJT-2P external controller. Strong load capacity; with the machine tool electrical appliances can achieve the return of the machine without protection; it can enhance the self-protection ability of safety light curtain sensor.
KJT safety light curtain sensor and KJTS safety light curtain sensor can not only use output contact signal with the controller, but also directly output NPN and PNP signals to connect with PLC or PC, and directly attach relay. At this time, the follow-up controller circuit should be safe and reliable.

KJTS Series Safety Light Curtain

Self-inspection safety circuit design

Double circuit is adopted to increase the safety and reliability of the output signal. When the safety light curtain sensor itself appears device or line fault, it shall ensure not to output dangerous failure signals to the controlled equipment, so as to ensure the safety control of the controlled equipment. The controller is designed separately from the light screen device to ensure the safety of the light screen induction signal transmission. The system conducts real-time self-check on the final output signal, so as to ensure the overall safety and full self-check of the system control.

Low power design

The safety light curtain sensor is designed with low power consumption, which can reduce the failure rate, prolong the service life and save energy.

Simple and diverse installation methods

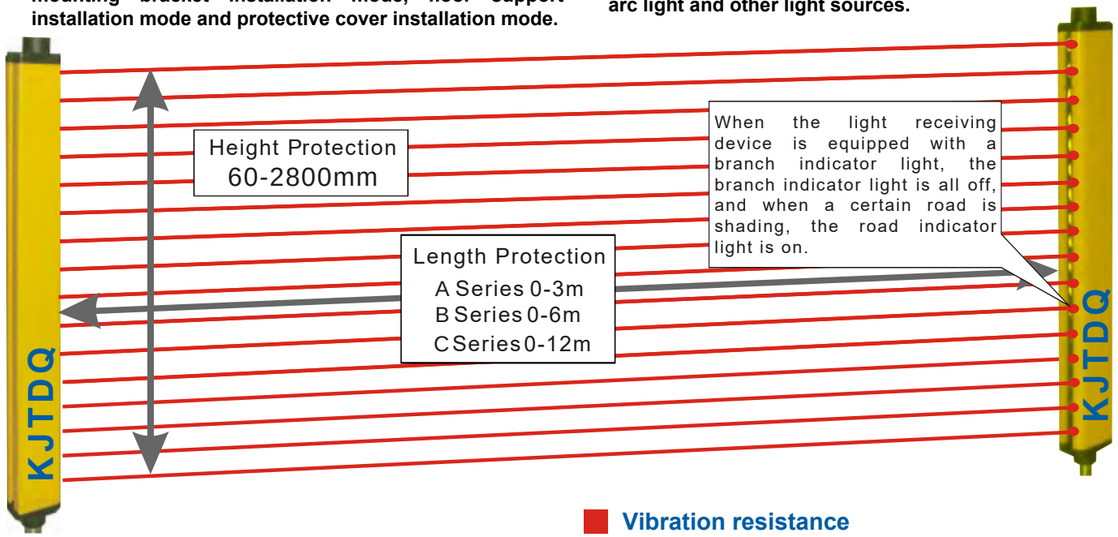
The installation modes of luminator and light receiver include general upper and lower anti-vibration installation mode, T-groove installation mode, pipe mounting bracket installation mode, floor support installation mode and protective cover installation mode.

Response Time

The maximum time between the blocking of the light spot of the safety light curtain sensor and the output stop signal to the device is the response time of the safety light curtain sensor.The response time of KJT and KJTS series light curtain sensor is 15ms.

Anti-Light, electromagnetic interference ability

The safe light curtain sensor works stably and reliably in the environment of frequency conversion electromagnetic wave, stroboscopic light, welding arc light and other light sources.

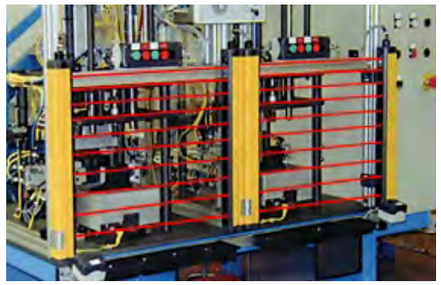


Easy focus

Safety light curtain sensor, easy to focus in the process of installation and use, low requirement for safety precision, convenient installation and use.

Vibration resistance

KJTS safety light curtain sensor adopts good vibration reduction design to ensure its reliable use in high speed punching machine, large tonnage punching machine, heavy machinery and other occasions with large vibration.



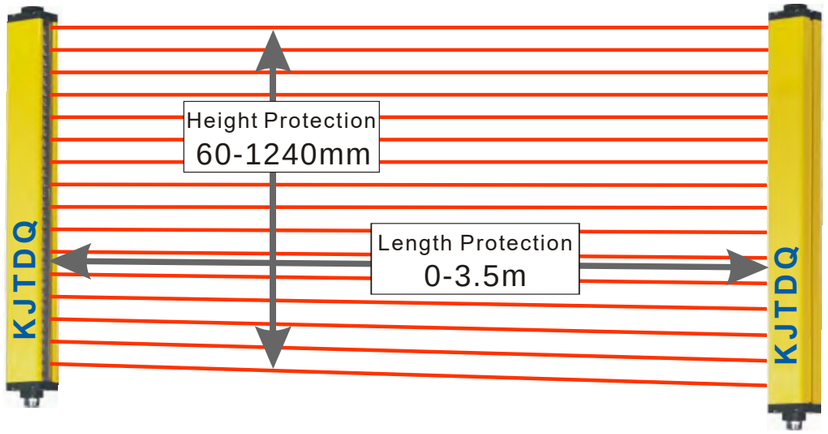
KJT Safety Light Curtain application

KJT、KJTS

KJTS Safety Light Curtain application

KJT Safety Light Curtain

- It is used for safety protection of small and medium-sized dangerous equipment or dangerous area, such as hydraulic pressure, forging, welding, shearing, etc., and can reliably protect the safety of human body or object, as well as signal acquisition of logistics, production assembly line and automatic control equipment.
- According to IEC61496-1/2 standard of international electrotechnical society, it belongs to self-test, fault stop.
- Ultra-small design, width and thickness of only 30mm×38mm, can be used for small machine equipment
- NPN or PNP dual output can be connected to the safety light curtain controller, safety relay, also can be directly connected to PLC, PC or external relay, at this time to ensure the safety and reliability of equipment follow-up control circuit.
- Red, yellow and green indicators enable users to accurately, intuitively and quickly discover the possible faults of the equipment.
- High reaction rate, reaction time is only 15ms.



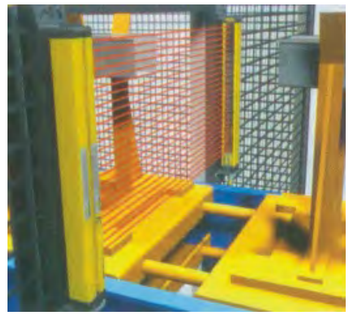
Safety Light Controller

KJT-1A
KJT-1D

Personnel Protection

Small Machinery Protection

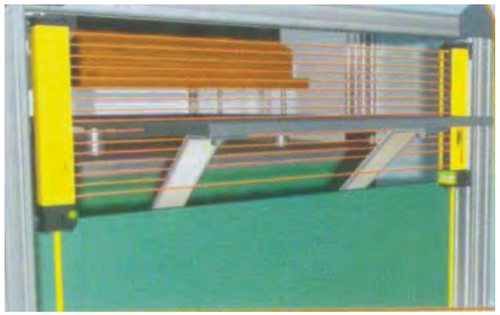
Logistics import and export inspection



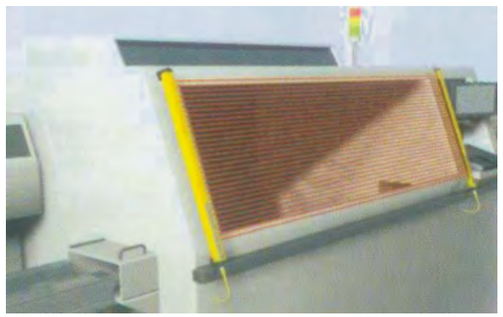
Model and Technical Parameters

Parameters and Model		KJT20	KJT40
Optical axis number		4/6/8/12/16/20/24 to 32	4/6/8/12/16/20/24 to 32
Optical axis spacing		20mm	40mm
Width protection		Optical axis distance × (number of optical -1)	
Detection range		0-3.5m	
Minimum detection object		30mm	50mm
Supply voltage		DC12-24V	
Power consumption		＜6W	
Response time		under 15ms	
Output current		100mA	
Output	NPN	Open collector NPN output：Input current 100mA, residual voltage below 1.6v	
	PNP	Open collector PNP output：Input current 100mA, residual voltage below 1.6v	
Output form		NPN or PNP dual output	
Output state		All optical axes receive light when ON	
Protection		With output short circuit protection function	
Light source		Infrared LED	
Indicator light	Light emitting device	Power indicator (Yellow)	
	Light detector	Power indicator (Yellow), Safety indicator (Green), Fault indicator (Red)	
Light environment		Incandescent light: Illuminance of luminous surface 3000Lx, Sunlight: Illuminance of luminous surface 10000Lx	
Ambient temperature		Working: -10°C ~ +55°C (but no icing), Saving: -25°C ~ +75°C	
Ambient humidity		Working: 35 ~ 85%RH, Saving: 35 ~ 95%RH	
Vibration resistance		Vibration Frequency: 10~55Hz, Amplitude: 0.35mm X, Y, Z, 2 hours in each direction	
Impact resistant		Acceleration: 300m/s^2 approximately 50g X, Y, Z, 3 Times in each direction	
Insulation resistance		AC: 1000V, 50/60Hz, 1 Minute	
Dielectric strength		DC500V，20MΩ	
Connection method		Equipped with special connection cable, transmitter 3 core, receiver 5 core	
Outer shell material		Protective housing: aluminum alloy, front cover: polycarbonate, upper and lower cover: ABS engineering plastic	
Protective structure		IEC IP65	

Hazardous Machinery Protection



Hazardous Machinery Protection



KJTDQ Industrial Safety Expert KJT Safety Light Curtain

Model No.

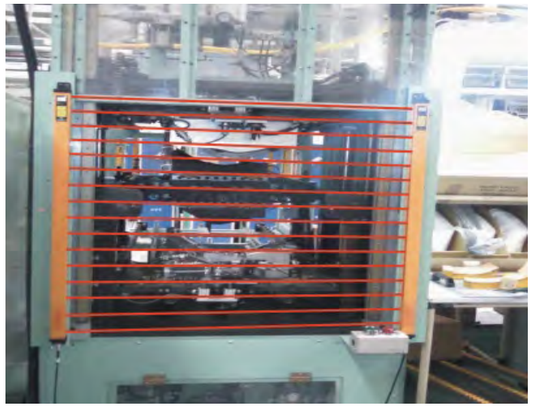
KJT□ — □ — □

- Output mode: None: NPN/PNP output、N: Dual Circuit NPN output、P: Dual Circuit PNP output
- Optical axis number: 4、6、8……32
- Optical axis spacing: 20:20mm 40:40mm
- Model No: KJT Safety Light Curtain

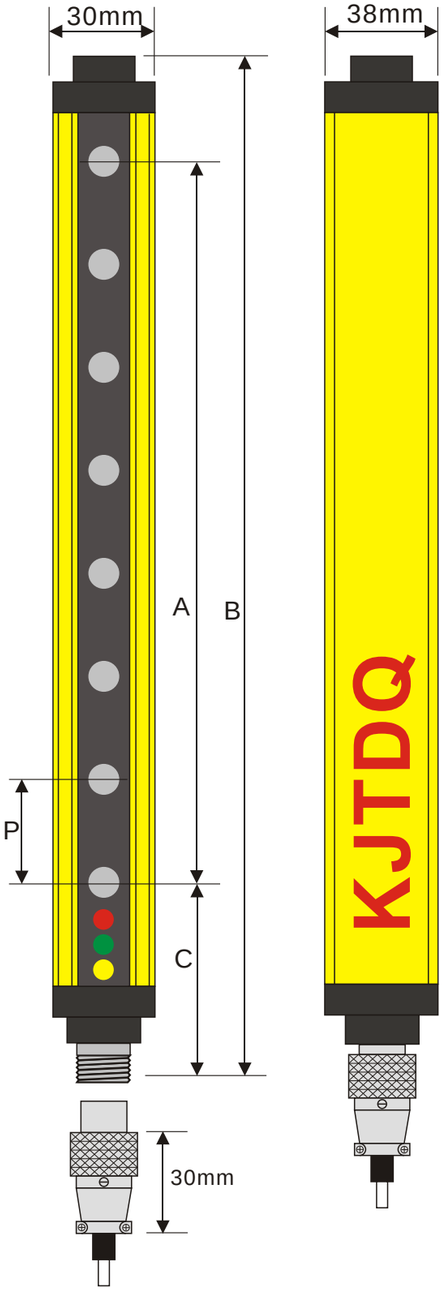
Model No.	Maximum detection distance	Optical axis spacing	Optical axis number	Width protection	Minimum detectable object
KJT20-4	3.5m	20mm	4	60mm	Opaque body ϕ30mm
KJT20-6			6	100mm	
KJT20-8			8	140mm	
KJT20-12			12	220mm	
KJT20-16			16	300mm	
KJT20-20			20	380mm	
KJT20-24			24	460mm	
KJT20-28			28	540mm	
KJT20-32			32	620mm	
KJT40-4		40mm	4	120mm	Opaque body ϕ50mm
KJT40-6			6	200mm	
KJT40-8			8	280mm	
KJT40-12			12	440mm	
KJT40-16			16	600mm	
KJT40-20			20	760mm	
KJT40-24			24	920mm	
KJT40-28			28	1080mm	
KJT40-32			32	1240mm	

Industrial Robot Protection

Industrial Robot Protection



Overall Dimension



Model No.	A	B	C	P
KJT20-4	60mm	155mm	50mm	20mm
KJT20-6	100mm	195mm	50mm	20mm
KJT20-8	140mm	235mm	50mm	20mm
KJT20-12	220mm	315mm	50mm	20mm
KJT20-16	300mm	395mm	50mm	20mm
KJT20-20	380mm	475mm	50mm	20mm
KJT20-24	460mm	555mm	50mm	20mm
KJT20-28	540mm	635mm	50mm	20mm
KJT20-32	620mm	715mm	50mm	20mm

Model No.	A	B	C	P
KJT40-4	120mm	235mm	50mm	40mm
KJT40-6	200mm	315mm	50mm	40mm
KJT40-8	280mm	395mm	50mm	40mm
KJT40-12	440mm	555mm	50mm	40mm
KJT40-16	600mm	715mm	50mm	40mm
KJT40-20	760mm	875mm	50mm	40mm
KJT40-24	920mm	1035mm	50mm	40mm
KJT40-28	1080mm	1195mm	50mm	40mm
KJT40-32	1240mm	1355mm	50mm	40mm

Remarks

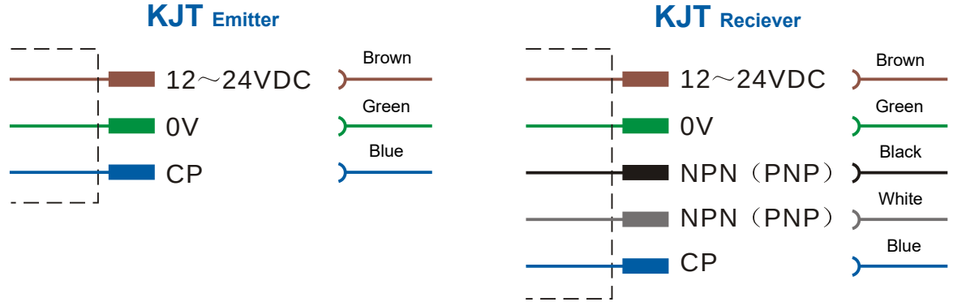
A: Safety Light Curtain Protection Height

B: Safety Light Curtain Overall Housing Length

P: Safety Light Curtain Resolution

Wiring Diagram of Safety Light Curtain Sensor

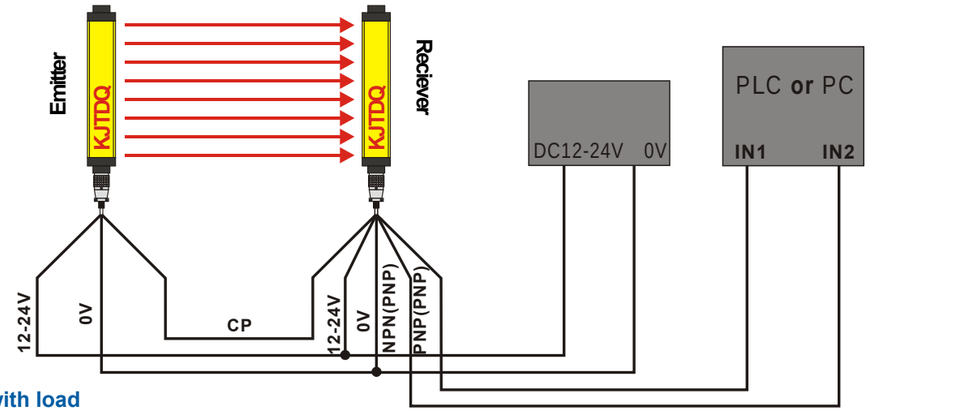
Wire Description



Wiring Mode of Safety Light Curtain Sensor

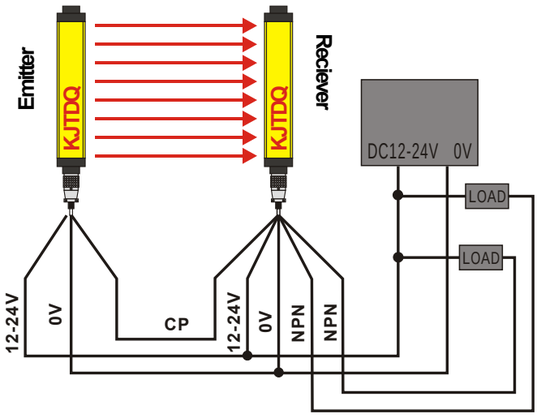
Direct Connect and use with PLC or PC

Firstly, connect the power cord DC12-24V (Brown wire)、OV (Green wire) on the transmitter and receiver to the DC power supply,then connect CP(Blue wires),finally, connect the signal wires (Black and white wires) of the receiver to the signal input terminal of PLC or PC. As shown in the figure.

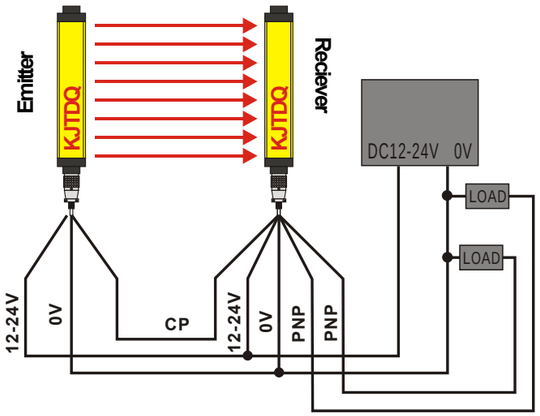


Direct use with load

NPN output with load



NPN output with load



Connection Method

- Connect the connecting cable of KJT series safety light curtains with the transmitter and receiver respectively through the aviation plug(Note: the connecting cables of transmitter is a three-wires system: Brown, Blue, Green; the connecting cables of receiver is a five-wires system: Brown, Blue, Green, Black, White)。
- Connect the brown wires of the transmitter and receiver to the positive pole of the power supply (DC 12-24V), the green wire to the negative pole, and the blue wire to the blue wire. The black or white wire is the output wire and connects to the input terminal of the device. If the load is a relay, connect the black or white wire to one of the input terminals of the relay (If the relay has polarity requirements, when the output is NPN, the black or white wire connects the negative pole of the relay;when the output is PNP, the black or white wire connects the positive pole of the relay, The other input of the relay is connected to the positive or negative pole of the power supply)。
- KJT Safety Light Curtain has Dual Circuit NPN output or Dual Circuit PNP output, which can be used in either one of the two output channels or both or independent settings at the same time. When selecting one of the output wire's for use, the other wire can be insulated.
- NPN/PNP simultaneous output mode of Safety Light Curtain, NPN for black wire, PNP for white wire, just according to your actual need, choose one output mode, other output can be eliminated or insulated.
- The input and output lines of the safety light curtain sensor should be distributed and wired separately from the power lines, high-voltage lines and other signal lines with high frequency, high-voltage and strong current, so as to avoid large interference.

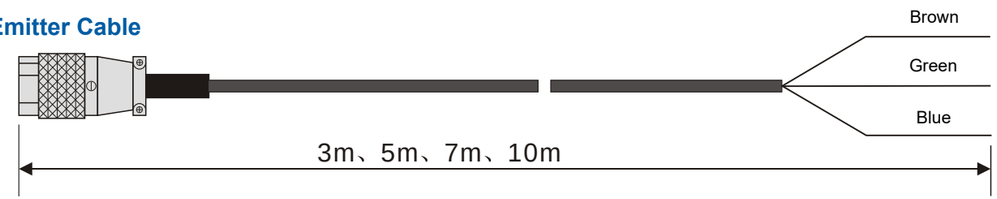
Connect with Safety Light Curtain Controller and Safety Relay

Press KJT-1A, KJT-1D Safety Controller, KJT-2A1B24N, KJT-2A1B24P wiring diagram connection of Safety Relay.

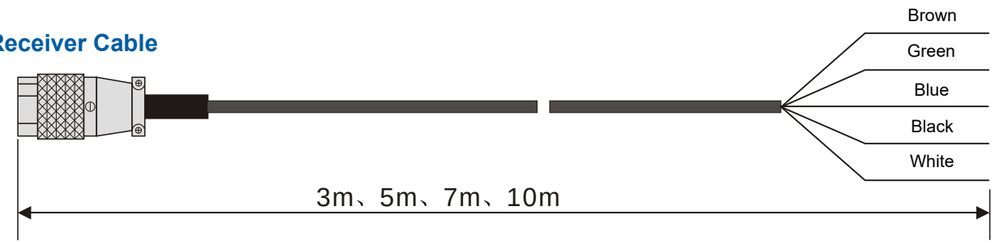
GA Safety Light Curtain Cable

Exterior	Model No.	Length	Purpose	
	KJT-F3E-3	3m	Three - core cable for Emitter	Use for connecting KJT Light Curtain with KJT-1A/ KJT-1D
	KJT-F5R-3		Five - core cable for Receiver	
	KJT-F3E-5	5m	Three - core cable for Emitter	
	KJT-F5R-5		Five - core cable for Receiver	
	KJT-F3E-7	7m	Three - core cable for Emitter	
	KJT-F5R-7		Five - core cable for Receiver	
	KJT-F3E-10	10m	Three - core cable for Emitter	
	KJT-F5R-10		Five - core cable for Receiver	

Emitter Cable



Receiver Cable



KJT-1A/1D Safety Light Curtain Controller

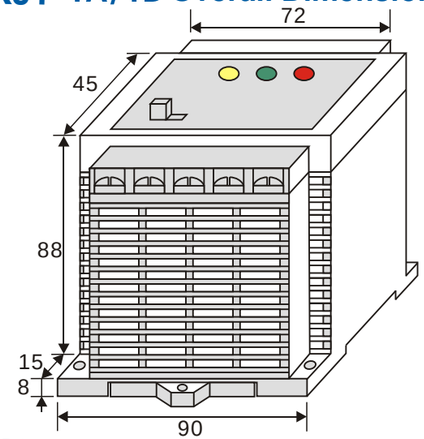
Features

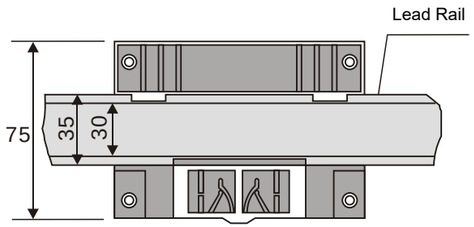
- The controller uses advanced dual CPU monitoring technology, to monitor together and effectively ensure the safety of the system.
- Connected with KJT Safety Light Curtain, it can monitor the running state of Safety Light Curtain at any time, and constitute a more secure protection system.
- The controller uses two interlocking relays to output together, which can guarantee the safety of the system reliably even if the relay is damaged.
- Provide input test function, can check the safety function of controller and safety light curtain sensor at any time.
- Red, Yellow and Green indicator light, users can accurately and intuitively find if the equipment appears faulty.
- KJT-1A/1D controller is small and compact and can be installed in machine tools or other equipment.

Model and Technical Parameters

Items		Parameter	
Safety Light Curtain Controller		KJT-1A	KJT-1D
Power supply voltage		AC100-260V 50/60Hz	DC24V±10%
Power consumption		10W	
Output voltage		DC24V 200mA	
Input signal	Light curtain signal	NPN input	
	Test signal	Contact input or NPN input	
Relay output		A set of normally open and normally closed relay passive contact output	
Contact capacity		AC250V 5A	
Light indicator		Power indicator (Yellow), Through indicator (Green), Fault indicator (Red)	
Response time		15ms	
Reset time		20ms	
Ambient temperature		Working: -10℃～+50℃ (But no frosting), Saving: -25℃～+55℃	
Ambient humidity		Working: 35～85%RH, Saving: 35～95%RH	
Vibration resistance		Vibration Frequency: 10~30Hz, Amplitude: 0.35mm X, Y, Z, 2 hours in each direction	
Radiation-resistant electromagnetic field		It can withstand the interference of 10V/m field strength of Radiated electromagnetic field	
Antistatic discharge		Can withstand 6KV electrostatic discharge interference	
Fast transient resistance		Can withstand the electrical fast transient pulse group interference of 2KV voltage	
Working life		Internal relays not less than 1 million times, electrical 10,000 hours	
Casting Material		ABS Engineering Plastic	
Protection grade		IEC IP50	

KJT-1A/1D Overall Dimension

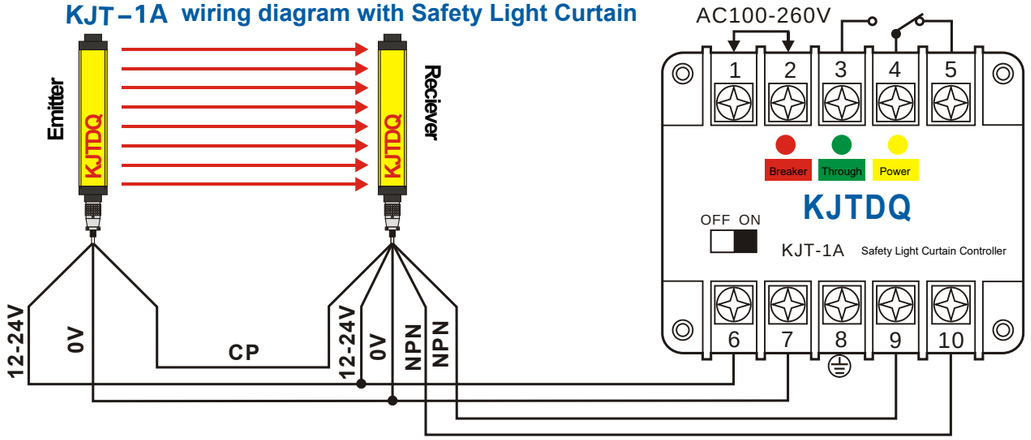




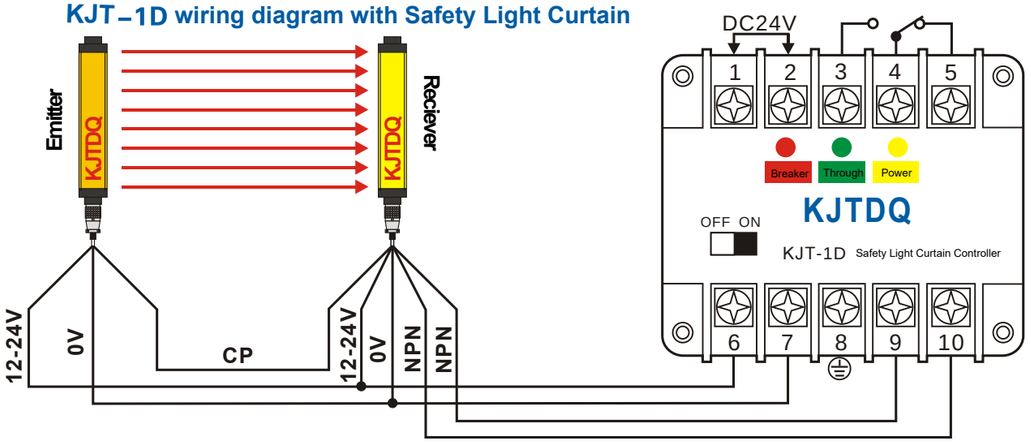
KJT-1A/1D wiring diagram of Safety Light Curtain Controller

Connection Method: First connect the Brown(DC12-24V), Green(0V) and Blue(CP) wiress on the transmitter and receiver of the safety light curtain sensor, then connect the Brown(DC 12-24V) and the Green(0V) wires to terminal 6 and 7 of the controller respectively. Finally connect the receiver's Black(NPN) and White(PNP) wires to terminal 9 and 10 of the controller. Terminal 8 of the controller is the ground terminal.

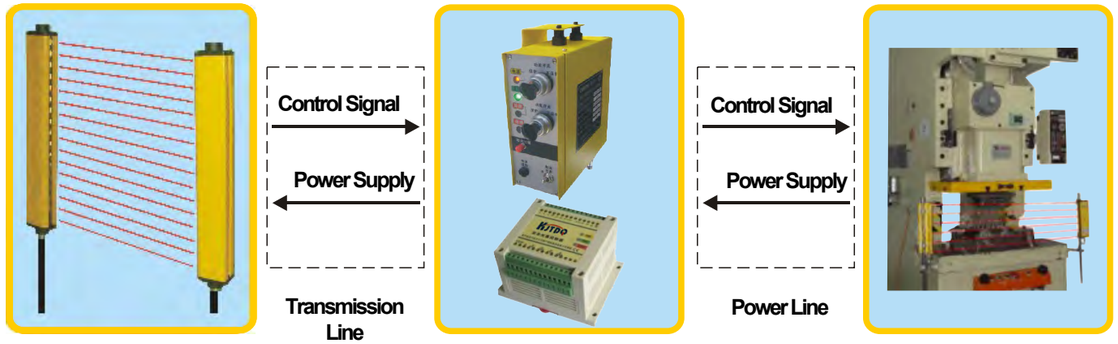
KJT-1A wiring diagram with Safety Light Curtain



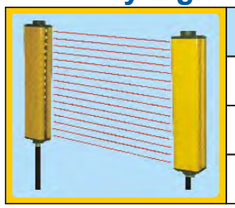
KJT-1D wiring diagram with Safety Light Curtain



Control Schematic Diagram

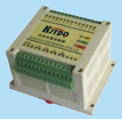


Safety Light Curtain Series



Series No.	Length Protection	Standard length of transmission line	Height Protection
A Series	0～3m	Transmitter, Receiver 5m Cable	60mm～2800mm See Safety Light Curtain specifications list
B Series	0～6m	Transmitter, Receiver 8m Cable	
C Series	0～12m	Transmitter, Receiver 15m Cable	

Safety Light Curtain Controller

Controller	Working Power Supply	Output Voltage	Output Form	Installation	Casting Material
	AC100-260V DC24V	DC12V 200mA	Relay Output	It is installed in the electric cabinet through the electrical guide rail	Engineering Plastic
	AC100-260V DC24V	DC12V 200mA	Relay Output	It is fixed on the machine body through the controller base	Metal Casing

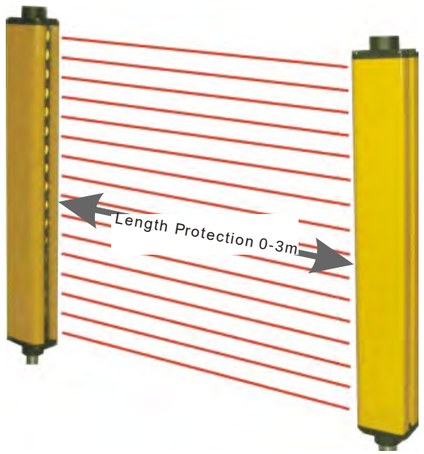
Safety Light Curtain Cable

Cable	Name	Withstand Voltage	Wire Length	Purpose
	KJT-1 controller power signal wire	RVV 300/500V	Standard type is 5m, 8m, 15m for longer needs to be customized	Provide power supply and signal transmission for Safety Light Curtain
	P type controller double end power signal wire	RVV 300/500V	Standard type is 5m, 8m, 15m for longer needs to be customized	Provide power supply and signal transmission for Safety Light Curtain
	P type controller single end transmission wire	RVV 300/500V	Standard type is 1.5m for longer needs to be customized	Power supply and signal transmission for the P type controller

KJTS Safety Light Curtain Applications

KJTS Type A series Safety Light Curtain, single - sided protection

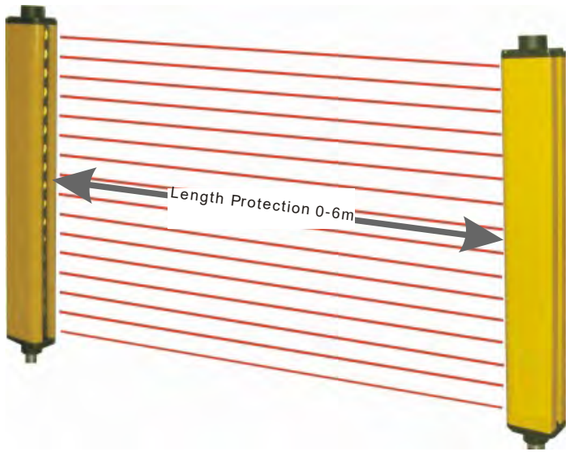
- Easy installation and debugging, simple wiring, firm structure, compact optical system.
- KJTS type A series safety light curtain sensor protection length is 0-3m, suitable for less than 3 meters machine table or area protection.
- The optical axis spacing is 10mm, 20mm, 30mm, 40mm and 80mm.
- It consists of a light emitting device, a light receiving device, a controller and a signal cable.



Application Example

KJTS Type B series Safety Light Curtain, single - sided protection

- Easy installation and debugging, simple wiring, firm structure and compact optical system.
- KJTS type B series safety light curtain sensor protection length is 0-6m, suitable for less than 6 meters machine table or area protection.
- The optical axis spacing is 10mm, 20mm, 30mm, 40mm and 80mm.
- It consists of a light emitting device, a light receiving device, a controller and a signal cable.



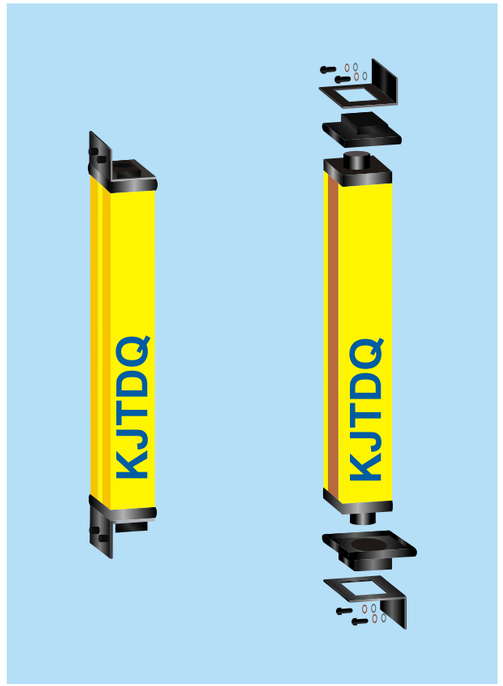
Application Example

Installation

Main Installation Mode

The installation mode can be divided into general upper and lower anti-vibration installation mode, T-groove side installation mode, pipe installation mode, floor installation mode and protective cover installation mode, which can meet the installation needs of Safety Light Curtain.

- Ordinary upper and lower anti-vibration installation mode is simple and reliable, as the main installation mode, can be installed through KS fixed frame shock absorber and can effectively reduce vibration.
- T groove side rotation installation mode is simple and practical, the Safety Light Curtain is fixed on the column of the equipment through two right-angle bending plates, its disadvantage is not easy to adjust, poor vibration resistance, suitable for the installation of equipment more stable occasions.
- Shock absorber is installed in the way of tube mounting bracket. Steel tube is connected with Safety Light Curtain through shock absorber, which can effectively reduce vibration. It is mainly used for equipment with large vibration, such as punch and press.
- The installation mode of floor bracket is generally used for dangerous area protection or safety protection of equipment working area.
- The installation mode of protective cover is used in the equipment where the Safety Light Curtain is vulnerable to bumps in use.

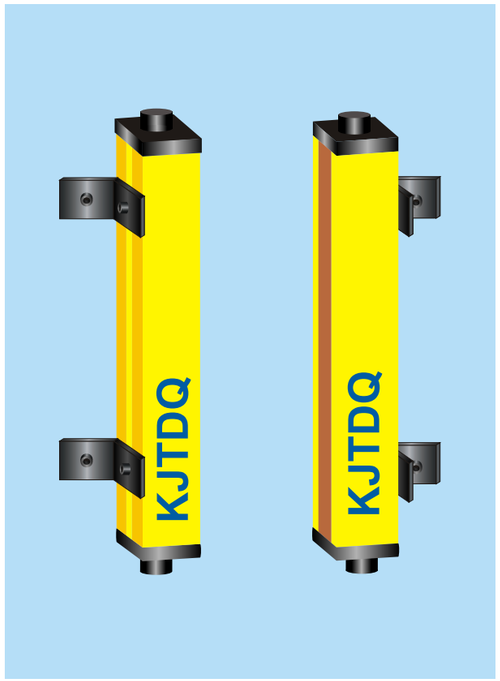


Formal mounting vibration proof installation mode

Install the emitter and receiver directly into the equipment through KS type normal mounting bracket, which is generally used for setting of frame structure. The installation method is shown in the figure

Example

Installation



Common side mounting

The emitter and receiver are fixed to the wall of the equipment by T nut and L-shaped bent plate bracket. Generally suitable for frame structure equipment. The installation method is shown in the figure

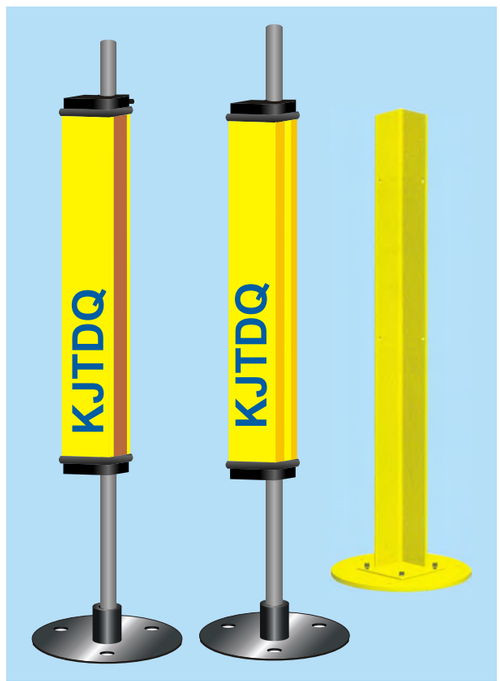
Example

Installation mode of tube mounting bracket

The light emitting device and the light receiving device are fixed on the adjustable tube mounting bracket by KS type tube fixing clip. The rotary arm seat is fixed on the base of the machine tool or the column. Generally used for machine tools, punching and pressing machine.The installation method is shown in the figure

Example

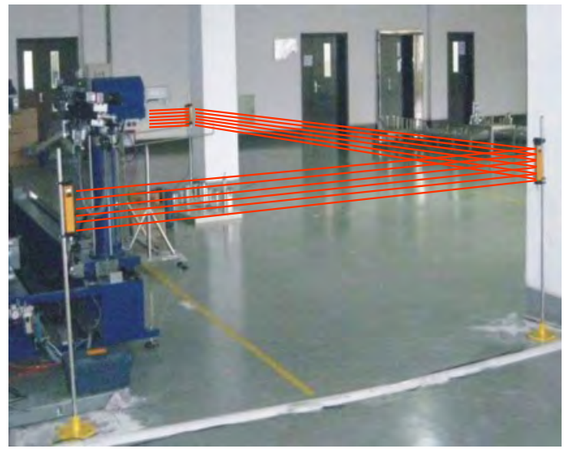
Installation



Floor bracket installation mode

The emitter and receiver are fixed on the adjustable tube mounting bracket through KS tube mounting clip, and the bracket base is fixed on the protected ground. Generally used for area protection. It has the advantage of minimizing vibrations.

Example



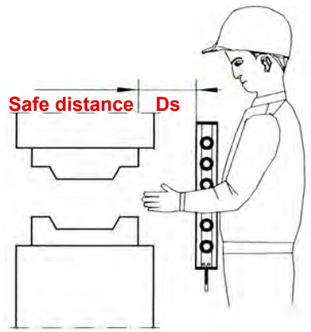
Protective cover installation mode

When the safety light curtain sensor is vulnerable to bump in the use of the time, you can add a protective cover, to protect the emitter, the receiver.The installation method is shown in the figure

Example

Installation of Safety Light Curtain

Determining the installation location



To ensure the personal safety of the operator, the installation position of the Safety Light Curtain must meet the requirements of the safety distance and height.

Safe distance refers to the minimum distance between the light screen plane of the Safety Light Sensor and the dangerous part of the equipment.

◆ Mechanical equipment that can stop automatically at any position of the stroke for mechanical sliders or dangerous parts.The safety formula is Ds=K (T+C).

K： Operator's hand extension speed,it is usually calculated at 1600mm/s.

T1： Response time of Safety Light Curtain, about 0.02s

T2： Maximum braking stop time of the equipment, i.e. from the start of braking to the stop time of the skid or dangerous part, unit (s).

◆ Machinery or equipment that cannot stop braking at any position of the stroke for mechanical sliders or dangerous parts.The safety formula is Ds=KT, where T= (112+1/N)Tn

K： Operator's hand extension speed,it is usually calculated at 1600mm/s.

T： The time per second (s), for the slider or dangerous part to travel down to the dead center.

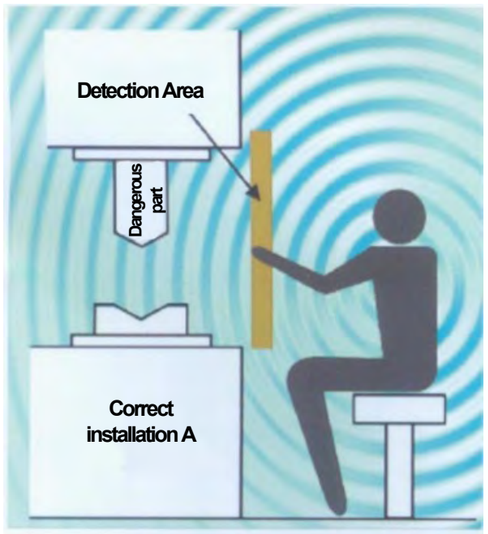
N： Number of clutch slots.

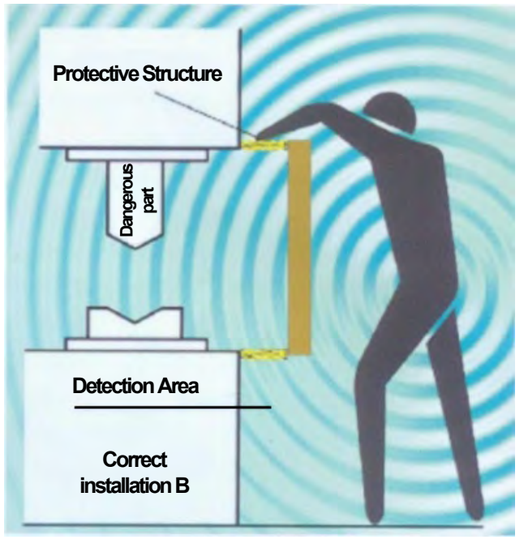
Tn：The time of revolution of the crankshaft, s per second.

Determining the installation height

The height position refers to the upper and lower position of the Safety Light Curtain sensor relative to the dangerous part of the mechanical equipment, That is, under the premise of ensuring safe distance, The last beam of the Safety Light Curtain sensor shall not be higher than the lower edge of the dangerous part, The first beam of light should not be lower than the upper edge of the dangerous part. Protection height > dangerous part stroke + adjustment amount.

Correct installation diagram





Safety Light Relay KJT–2A1B24N

Product Introduction

Safety Light Relay is widely used in industrial safety system, which can be used in conjunction with Safety Curtain Sensor to enhance the reliability of equipment safety system and constitute a more secure protection system.

Features

- The Safety Relay is operated by DC24V power supply.
- 2 sets of normally open safety contacts are output in series, and 1 set of normally closed auxiliary contacts are output in parallel.
- Double channel operation mode, NPN double channel input, reset switch with contact.
- With power indicator and channel 1 and channel 2 status indicator.
- By extending the module, the number of safety contacts can be increased.

Security Features

- In accordance with the standards EN60947-5-1, EN61000-6-2、EN61000-6-3, EN60204-1, ENISO13849-1
- Level 4 Safety
- A redundant circuit with self-monitoring.
- The safety function remains in effect even if one component is damaged.
- The safety function remains in effect even if one component is damaged.

Operating Mode

- The input circuit
  Dual channel NPN input, signal connected to S1, S2.
- Reset circuit
  Automatic reset, short connect S33-S34.
  Manual reset, connect reset button to S33-S34.

Input Circuit	
Input voltage	DC24V
Input current	Max 100mA
Input mode	**NPN Dual channel input**
Maximum cable resistance in input loop	100Ω

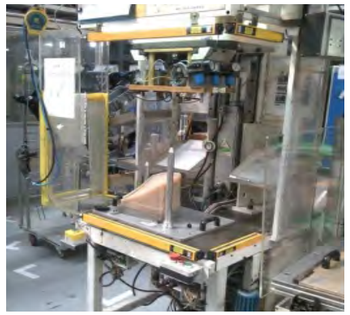
Output Circuit	
Output contacts	**2 NO 、 1 NC**
Contact fuse protection	4AT or 6AT
Maximum switching capacity: AC	AC-15，2A/250V DC-13，3A/24V
Contact material	**Silver alloy, Gold plated**
Contact life	⩾10,000ThousandTimes

Time	
Reaction time	⩽20ms
Automatic reset time	⩽100ms
Manual reset time	⩽50ms
Release buffer time	⩽10ms
Maximum power interruption before power failure	⩽1s

Mechanical data	
Shell material	**ABS Engineering Plastic**
Installation	**35mm DIN guide rail**
Maximum conductor size	**0.2-2.5mm²**
Terminal torque setting	**0.5Nm**
Connection mode	**Terminal connection**

Applications

Auto parts industry tooling equipment protection



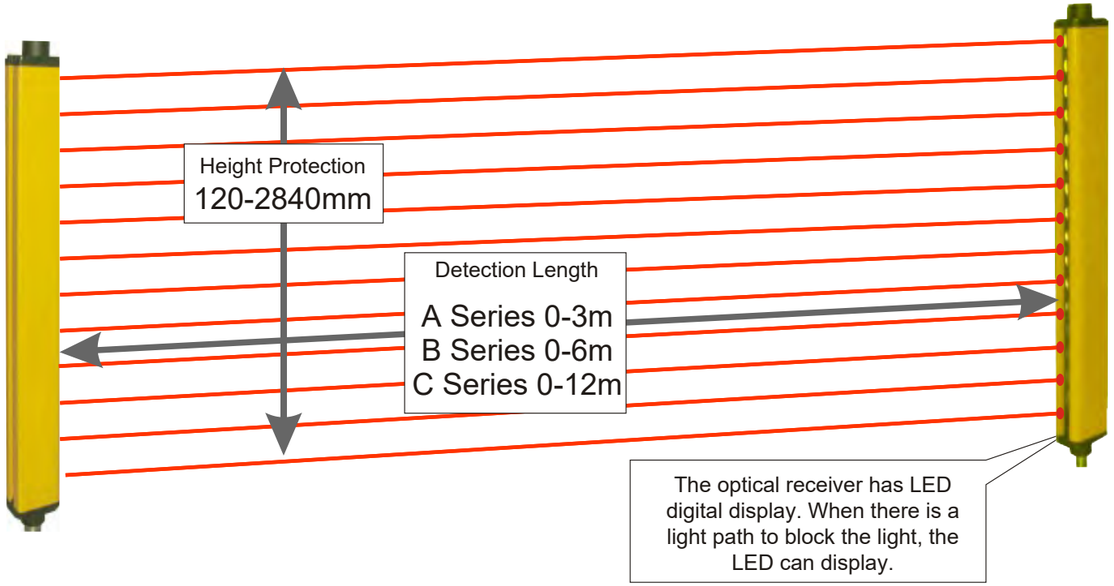
Industrial robot welding safety area protection

Punch safety protection

Features

- High precision testing and measurement for industrial automation systems include on-line testing, precision correction, cavity testing, edge and center positioning, tension control, part counting and on-line product size and shape testing and similar testing and measurement above.
- Overall dimension: 35 mm×50mm
- High resolution: minimum optical axis spacing is only 10mm,
- Multiple options: the detection height is from 120mm-2840mm, and the number of optical axis is from 4-72 channels, which can be selected according to the monitoring range of the device.
- Performance guarantee: amplifier external, using modulation light source, synchronous scanning mode, strong anti-external interference ability, easy to install and use.
- High quality protection ability: high quality protection structure and resistance, vibration, so that the light curtain can be used in bad occasions and heavy equipment reliable use.
- Main signal output: analog output (4-20mA or 1-5VDC output), RS485 communication output.

- Auxiliary signal output is normally open or normally closed relay passive contact output, can be connected to any load.
- Digital tube Red, Yellow, Green indicator light enable users to accurately, directly and quickly display the state of the measured object.
- High reaction rate, reaction time is only 20ms



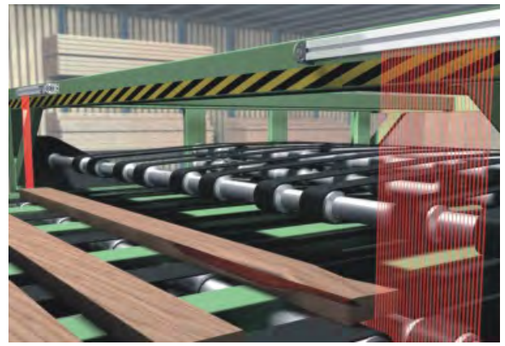
Applications

Carton measurement and sorting

Three sets of light screens are used to measure the height, length, degree, and width of the object respectively, and the data is sent to the background program to calculate the volume of the object .In the logistics industry, the function of sorting objects can also be achieved by setting the height, length or volume of cartons.

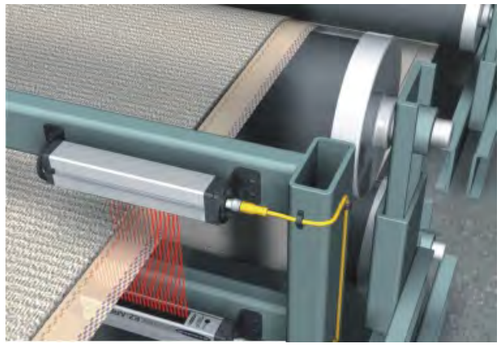
Cutting quantity of wood

Measure the length of the board and check if the board is deformed. Any board exceeding the specification will be kicked out. At the same time, determine whether the wood is bent by measuring its length, because bending will cause the length of the wood to change.



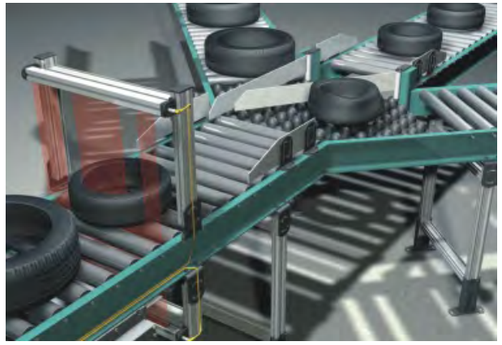
Detect deviation of cloth or blanket

When the cloth or blanket passes through the measuring light curtain, the measuring light curtain detects the edge of cloth or blanket and the woven edge, and outputs the signal to the control system for position correction.



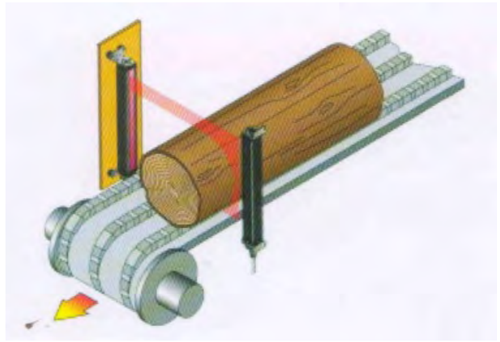
Tire classification

Two sets of measuring light screen are adopted to detect the inner and outer diameter of tires, and the tires are transported to the corresponding conveyor belt. If the tire size does not conform to the specifications, the packing will be refused.



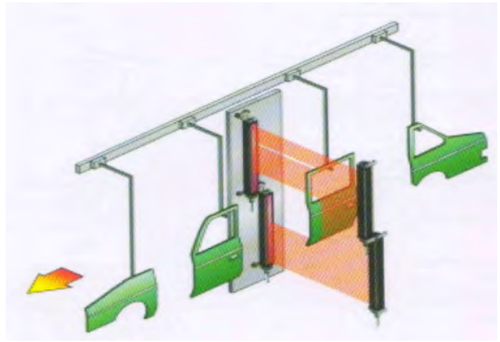
Wood dimension measurement

Measuring log diameter, used for wood surface processing, before entering the peeling equipment, measuring log size adjustment fixture and peeling tool



Wood spraying control

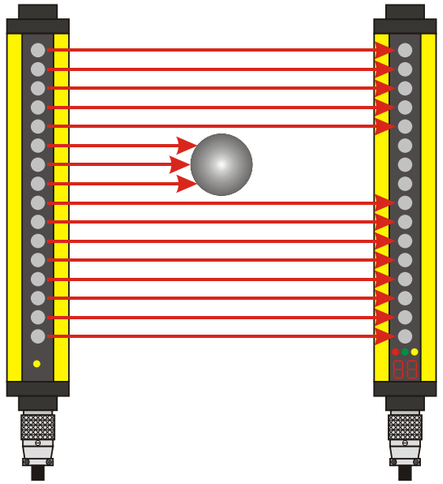
The measuring part profile information is provided to the automatic spraying equipment to control the corresponding spraying position.



Working Principle

KJT measuring grating is composed of a emitter and a receiver. The light emitted by the emitter is directed to the receiver, forming a light curtain measurement system. A target-detecting object placed between the emitter and the receiver will block some of the light and prevent the receiver from receiving the light from the emitter.

KJT measuring light curtain uses synchronous scanning to identify the channel being blocked. First, an emitter channel sends out a light pulse and the corresponding receiver searches for the pulse at the same time. When found, the scanning of one channel is completed, followed by the next channel until all the scanning is completed. When a cycle scan is completed, the system records which channels pass light and which channels are blocked. According to the system definition, a signal is output, which can be made into analog signal, switch signal and Rs485 communication signal.



Control Output Type

- Switch output: normally open or normally closed relay output.
  - When different number of beams are blocked by program, the light curtain has signal output.
  - By means of built-in (or external) adjustment switch, it can be set to block different number of beams, and then the light curtain has signal output.
  - When it is applied to cavity detection, when any beam passes through light, the light curtain has signal output.
  - When applied to the eight-bit binary output to block different number of beams, the light screen is output in the eight-bit binary mode.
  - When it is applied to the eight-bit binary output to block different number of beams, the light screen outputs the blocking position according to the eight-bit binary mode.
- Analog signal output: 4-20mA or 1-5VDC, connected to PC or other data acquisition system.
- It has RS232 or RS485 communication function and adopts standard MODBUS protocol to communicate with host computer.

Precautions for Measuring Light Curtain

Measure the light curtain response time

The response time of measuring the light curtain system depends on the time when the light curtain sees the target object. When the beam channel blocked by the target object this happens to be the same beam path that the light curtain is currently scanning, the shortest response time obtained is 1ms. The maximum response time is twice that of the system scan. The scanning time of the system depends on the height of the light screen and the scanning mode.

Measure the speed at which the maximum object passes through the light curtain

The maximum velocity of the light curtain measured by the object is determined by the following three aspects: the size of the measured object, the diameter of the lens, and the maximum response time of the light curtain.

Measure the minimum amount of light screen to detect objects

Measuring the light screen can detect the minimum object size related to the single channel lens diameter and optical axis distance. Definition: the smallest diameter of a cylinder that can be reliably detected.

Model and Technical Parameters

Parameters and model		KJTH10	KJTH20	KJTH30	KJTH40
Optical axis number		16/24/32 to 72	8/10/12/14 to 72		4/6/8/10 to 72
Optical axis spacing		10mm	20mm	30mm	40mm
Minimum object detection		15mm	30mm	40mm	50mm
Width protection		Optical axis distance × (number of optical paths -1)			
Detection range		A Series: 0-3m B Series: 0-6m C Series: 0-12m			
Power supply voltage		DC24V			
Power consumption		＜6W			
Response time		Under 15ms			
Output current		100mA			
Main output	Analog output	1-5VDC or 4-20mA Output			
	Communication output	Rs485 Modbus Protocol RTU Binary Mode			
AUX output	Output mode	Relay passive contact output			
	Output state	Normally open or normally closed output state			
	Contact capacity	2A/250V、30VDC			
Protection		With output short circuit protection function			
Light source		Infrared LED			
Light indicator	Emitter	Power indicator (Yellow)			
	Receiver	Power indicator (Yellow), Safety indicator (Green), Fault indicator (Red)			
LED		0-72			
Operational environment	Ambient temperature	Working: -10～+55℃ no forsting, Saving: -25～+75℃			
	Ambient humidity	Working: 35～85%RH, Saving: 35～95%RH			
	Light environment	Incandescent light: Illuminance of luminous surface 3000Lx, Sunlight: Illuminance of luminous surface 10000Lx			
Storage environment	Ambient temperature	Working: -10～+55℃ no forsting, Saving: -25～+75℃			
	Ambient humidity	Working: 35～85%RH, Saving: 35～95%RH			
Vibration resistance		Vibration Frequency: 10~55Hz, Amplitude: 0.35mm X, Y, Z, 2 hours in each direction			
Impact resistance		Acceleration :300m/s^2, about 50g, 3 times in X, Y and Z directions			
Insulation resistance		AC1000V ， 50/60Hz ， 1 minute			
Dielectric strength		DC500V ， 20M Ω			
Connection type		Equipped with special connection cable, transmitter 5 core, receiver 9 core			
Housing material		Protective housing: aluminum alloy, front cover: polycarbonate, upper and lower cover: ABS engineering plastic			
Protection structure		IEC IP65			

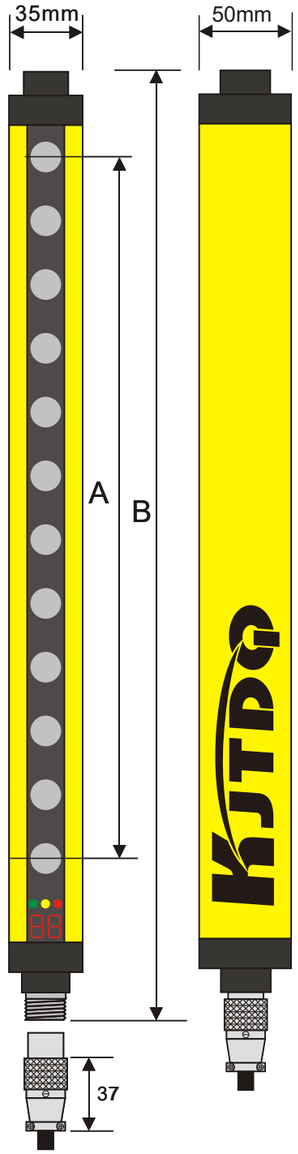
Model No.

KJT □ □ — □ □

- Output mode: I:4-20mA Output U:1-5VDC Output R:RS485 Communication output
- Optical axis number: 4, 6, 8, 10, 12 ... 72
- Detection distance: A:0-3m B:0-6m C:0-12m
- Optical axis spacing: 10:10mm 20:20mm 30:30mm 40:40mm
- Model No: KJTH Type

Optical axis number	Optical axis spacing 10mm				Optical axis spacing 20mm				Optical axis spacing 30mm				Optical axis spacing 40mm			
	Specifications			Height Protection	Specifications			Height Protection	Specifications			Height Protection	Specifications			Height Protection
	A Series	B Series	C Series		A Series	B Series	C Series		A Series	B Series	C Series		A Series	B Series	C Series	
4													KJTH40□ -4			120mm
6													KJTH40□ -6			200mm
8					KJTH20□ -8			140mm	KJTH30□ -8			210	KJTH40□ -8			280mm
10					KJTH20□ -10			180mm	KJTH30□ -10			270	KJTH40□ -10			360mm
12					KJTH20□ -12			220mm	KJTH30□ -12			330	KJTH40□ -12			440mm
14					KJTH20□ -14			260mm	KJTH30□ -14			390	KJTH40□ -14			520mm
16	KJTH10□ -16			150mm	KJTH20□ -16			300mm	KJTH30□ -16			450	KJTH40□ -16			600mm
18					KJTH20□ -18			340mm	KJTH30□ -18			510	KJTH40□ -18			680mm
20					KJTH20□ -20			380mm	KJTH30□ -20			570	KJTH40□ -20			760mm
22					KJTH20□ -22			420mm	KJTH30□ -22			630	KJTH40□ -22			840mm
24	KJTH10□ -24			230mm	KJTH20□ -24			460mm	KJTH30□ -24			690	KJTH40□ -24			920mm
26					KJTH20□ -26			500mm	KJTH30□ -26			750	KJTH40□ -26			1000mm
28					KJTH20□ -28			540mm	KJTH30□ -28			810	KJTH40□ -28			1080mm
30					KJTH20□ -30			580mm	KJTH30□ -30			870	KJTH40□ -30			1160mm
32	KJTH10□ -32			310mm	KJTH20□ -32			620mm	KJTH30□ -32			930	KJTH40□ -32			1240mm
34					KJTH20□ -34			660mm	KJTH30□ -34			990	KJTH40□ -34			1320mm
36					KJTH20□ -36			700mm	KJTH30□ -36			1050	KJTH40□ -36			1400mm
38					KJTH20□ -38			740mm	KJTH30□ -38			1110	KJTH40□ -38			1480mm
40	KJTH10□ -40			390mm	KJTH20□ -40			780mm	KJTH30□ -40			1170	KJTH40□ -40			1560mm
42					KJTH20□ -42			820mm	KJTH30□ -42			1230	KJTH40□ -42			1640mm
44					KJTH20□ -44			860mm	KJTH30□ -44			1290	KJTH40□ -44			1720mm
46					KJTH20□ -46			900mm	KJTH30□ -46			1350	KJTH40□ -46			1800mm
48	KJTH10□ -48			470mm	KJTH20□ -48			940mm	KJTH30□ -48			1410	KJTH40□ -48			1880mm
50					KJTH20□ -50			980mm	KJTH30□ -50			1470	KJTH40□ -50			1960mm
52					KJTH20□ -52			1020mm	KJTH30□ -52			1530	KJTH40□ -52			2040mm
54					KJTH20□ -54			1060mm	KJTH30□ -54			1590	KJTH40□ -54			2120mm
56	KJTH10□ -56			550mm	KJTH20□ -56			1100mm	KJTH30□ -56			1650	KJTH40□ -56			2200mm
58					KJTH20□ -58			1140mm	KJTH30□ -58			1710	KJTH40□ -58			2280mm
60					KJTH20□ -60			1180mm	KJTH30□ -60			1770	KJTH40□ -60			2360mm
62					KJTH20□ -62			1220mm	KJTH30□ -62			1830	KJTH40□ -62			2440mm
64	KJTH10□ -64			630mm	KJTH20□ -64			1260mm	KJTH30□ -64			1890	KJTH40□ -64			2520mm
66					KJTH20□ -66			1300mm	KJTH30□ -66			1950	KJTH40□ -66			2600mm
68					KJTH20□ -68			1340mm	KJTH30□ -68			2010	KJTH40□ -68			2680mm
70					KJTH20□ -70			1380mm	KJTH30□ -70			2070	KJTH40□ -70			2760mm
72	KJTH10□ -72			710mm	KJTH20□ -72			1420mm	KJTH30□ -72			2130	KJTH40□ -72			2840mm

External Dimension (in mm)



Model No.	A	B
KJTH20 □- 8	140	240
KJTH20□ -10	180	280
KJTH20□ -12	220	320
KJTH20□ -14	260	360
KJTH20□ -16	300	400
KJTH20□ -18	340	440
KJTH20□ -20	380	480
KJTH20□ -22	420	520
KJTH20□ -24	460	560
KJTH20□ -26	500	600
KJTH20□ -28	540	640
KJTH20□ -30	580	680
KJTH20□ -32	620	720
KJTH20□ -34	660	760
KJTH20□ -36	700	800
KJTH20□ -38	740	840
KJTH20□ -40	780	880
KJTH20□ -42	820	920
KJTH20□ -44	860	960
KJTH20□ -46	900	1000
KJTH20□ -48	940	1040
KJTH20□ -50	980	1080
KJTH20□ -52	1020	1120
KJTH20□ -54	1060	1160
KJTH20□ -56	1100	1200
KJTH20□ -58	1140	1240
KJTH20□ -60	1180	1280
KJTH20□ -62	1220	1320
KJTH20□ -64	1260	1360
KJTH20□ -66	1300	1400
KJTH20□ -68	1340	1440
KJTH20□ -70	1380	1480
KJTH20□ -72	1420	1520

Model No.	A	B
KJTH30 □-8	210	320
KJTH30□ -10	270	380
KJTH30□ -12	330	440
KJTH30□ -14	390	500
KJTH30□ -16	450	560
KJTH30□ -18	510	620
KJTH30□ -20	570	680
KJTH30□ -22	630	740
KJTH30□ -24	690	800
KJTH30□ -26	750	860
KJTH30□ -28	810	920
KJTH30□ -30	870	980
KJTH30□ -32	930	1040
KJTH30□ -34	990	1100
KJTH30□ -36	1050	1160
KJTH30□ -38	1110	1220
KJTH30□ -40	1170	1280
KJTH30□ -42	1230	1340
KJTH30□ -44	1290	1400
KJTH30□ -46	1350	1460
KJTH30□ -48	1410	1520
KJTH30□ -50	1470	1580
KJTH30□ -52	1530	1640
KJTH30□ -54	1590	1700
KJTH30□ -56	1650	1760
KJTH30□ -58	1710	1820
KJTH30□ -60	1770	1880
KJTH30□ -62	1830	1940
KJTH30□ -64	1890	2000
KJTH30□ -66	1950	2060
KJTH30□ -68	2010	2120
KJTH30□ -70	2070	2180
KJTH30□ -72	2130	2240

Model No.	A	B
KJTH40□ -4	120	240
KJTH40□ -6	200	320
KJTH40□ -8	280	400
KJTH40□ -10	360	480
KJTH40□ -12	440	560
KJTH40□ -14	520	640
KJTH40□ -16	600	720
KJTH40□ -18	680	800
KJTH40□ -20	760	880
KJTH40□ -22	840	960
KJTH40□ -24	920	1040
KJTH40□ -26	1000	1120
KJTH40□ -28	1080	1200
KJTH40□ -30	1160	1280
KJTH40□ -32	1240	1360
KJTH40□ -34	1320	1440
KJTH40□ -36	1400	1520
KJTH40□ -38	1480	1600
KJTH40□ -40	1560	1680
KJTH40□ -42	1640	1760
KJTH40□ -44	1720	1840
KJTH40□ -46	1800	1920
KJTH40□ -48	1880	2000
KJTH40□ -50	1960	2080
KJTH40□ -52	2040	2160
KJTH40□ -54	2120	2240
KJTH40□ -56	2200	2320
KJTH40□ -58	2280	2400
KJTH40□ -60	2360	2480
KJTH40□ -62	2440	2560
KJTH40□ -64	2520	2640
KJTH40□ -66	2600	2720
KJTH40□ -68	2680	2800
KJTH40□ -70	2760	2880
KJTH40□ -72	2840	2960

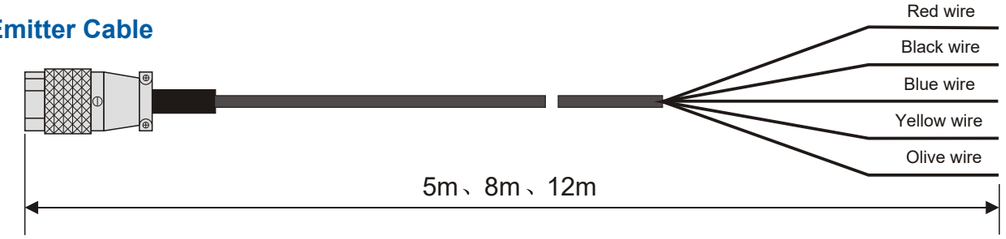
- A： Safety Light Curtain Sensor protection height
- B： Overall housing length of Safety Light Curtain Sensor
- “□” Represents the detection length of measuring grating A is 0-3m, B is 0-6m, and C is 0-12m

Model No.	A	B
KJTH10□ -16	150	240
KJTH10□ -24	230	320
KJTH10□ -32	310	400
KJTH10□ -40	390	480
KJTH10□ -48	470	560
KJTH10□ -56	550	640
KJTH20□ -64	630	720
KJTH10□ -72	710	800

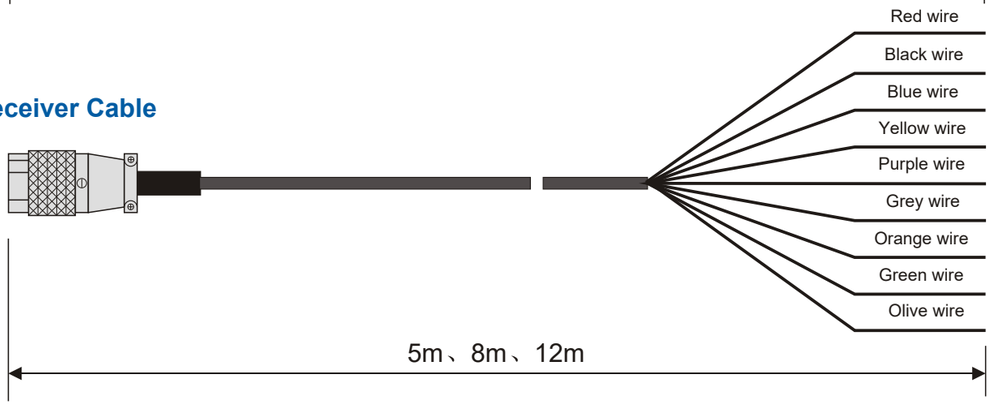
KJT Safety Light Curatin Cable

Appearance	Model No.	Length	Purpose	
	KJT-F5E-5	5m	Five core cable, for Emitter	Used for KJT measuring Light Curtain connection with other control equipment.
	KJT-F9R-5		Nine core cable, for Receiver	
	KJT-F5E-8	8m	Five core cable, for Emitter	
	KJT-F9R-8		Nine core cable, for Receiver	
	KJT-F5E-15	15m	Five core cable, for Emitter	
	KJT-F9R-15		Nine core cable, for Receiver	

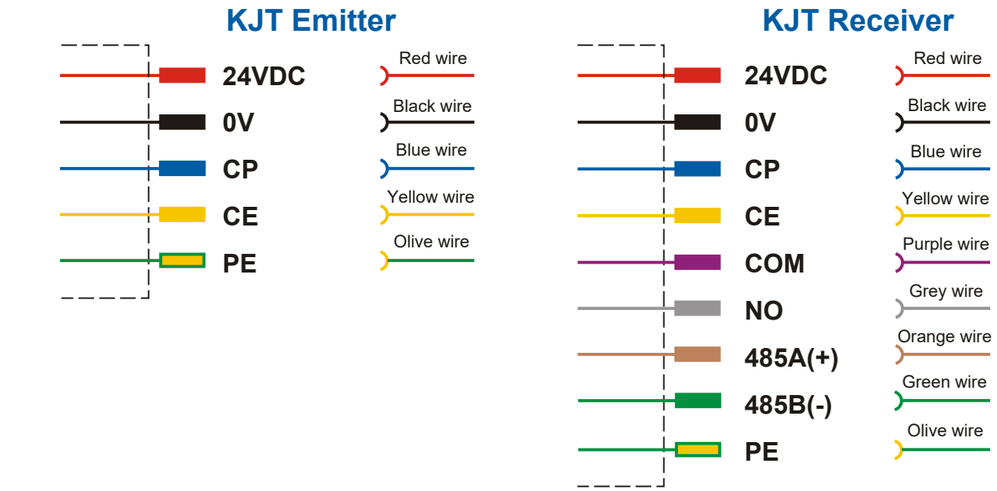
Emitter Cable



Receiver Cable



Wire Instructions



Note: Connect the Blue wire and Yellow wire of transmitter and receiver respectively.

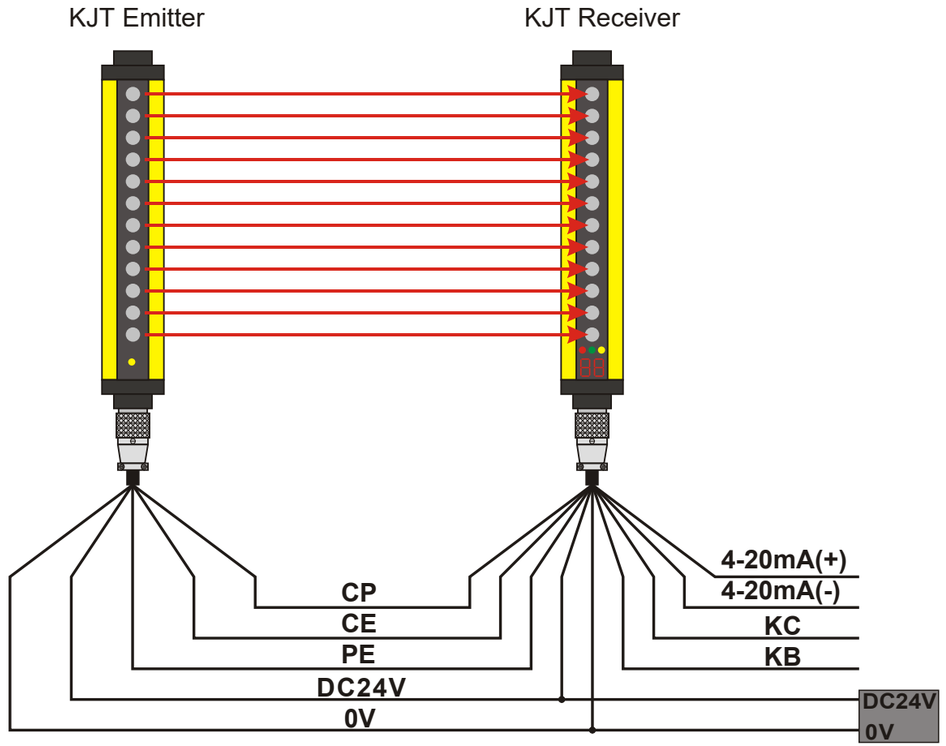
4–20mA Analog output type measuring Light Curtain

Output mode description

The output current of the light curtain is related to the position of the interrupted point in the light curtain. For example, the current output of a light curtain with 24 points of light spots increases by 0.666mA(16mA/24=0.666mA),That is, when all the light spots are not interrupted, the output current is 4mA. The output current is 4.666mA when interruptting the first light spot, the output current is 5.332mA when interruptting the second light spot, the output current is 5.998mA when interruptting the third light spot. Similarly, the output current is 19.984mA when interruptting the light spot in the 24th channel. The highest light spot shall prevail when interruptting the light spot of 2 channels and above at the same time.

The measuring light curtain of current output has very high requirements on power supply, so a high-quality DC switching power supply must be used for power supply alone, and DC24V power supply cannot be shared with other devices, otherwise the output current will be inaccurate, and the light curtain and output errors will be damaged seriously.

Output wiring diagram



Red wire	（DC24V）	：Positive pole, connected to the power supply DC24V.
Black wire	（0V）	： Power negative pole, connect to power supply 0V.
Blue wire	（CP）	： Emitter docks with the blue line of the light receiver.
Yellow wire	（CE）	： Emitter docks with the yellow line of the light receiver.
Purple wire	（COM）	：Auxiliary relay output common line.
Grey wire	（ON）	： Auxiliary relay output normal open wire.
Orange wire	（4-20mA+）	： Analog output 4-20mA+
Green wire	（4-20mA-）	： Analog output 4-20mA-
Olive wire	（PE）	： Shielding wire.

Rs485 Communication output type measuring safety light curtain

● Z— Bus Measurement safety light bus protocol description

The information frame is made up of 485 measurement light screen, and each frame data is composed of 6 fields, including leading byte, frame start code, data length, data field, check code and frame end code. Each field consists of several bytes: each byte contains eight bits of binary code, plus one start bit and one stop bit when transmitted, for a total of 10 bits. BPS rate 9600, 16 bit CRC check, communication using 485.

◆ Leading byte: BOOT

All frames sent by or from a primary station are preceded by a specified number of hexadecimal characters, called the leading bytes of the frame. Leading bytes are essentially a physical layer requirement and are often used to synchronize transceivers, typically 2-4 bytes, which is specified here as 2 bytes.

◆ Frame start code: START

Frame start code 0xCA indicates the beginning of a frame of information.1 byte.

◆ Data length: DLC

The data length field contains an integer representing the number of bytes, expressed in hexadecimal, which is the count of the data bytes between the data length field and the check field (excluding those two fields).The maximum DLC is 24,1 byte.

◆ Data fields: DATA

The data field has a maximum of 22 bytes, and the first byte of the data field is the command code number of light spots.

◆ Check code: CRC

The CRC-CCITT check is performed on the data between the frame start code and the check code (excluding the three characters). 2 bytes, high byte first, low byte last.

◆ Frame end: END

Frame end 0xcc indicates the end of a frame of information.1 byte.

● A complete Z-BUS information frame is as follows:

BOOT + START + DLC + DATA + CRC + END

BOOT ：0xAB + 0xBA

START：0xCA

DLC： DLC ≤24

DATA： DATA0,DATA1,DATA22

CRC： CRC check, 2 byte

END： 0xCC

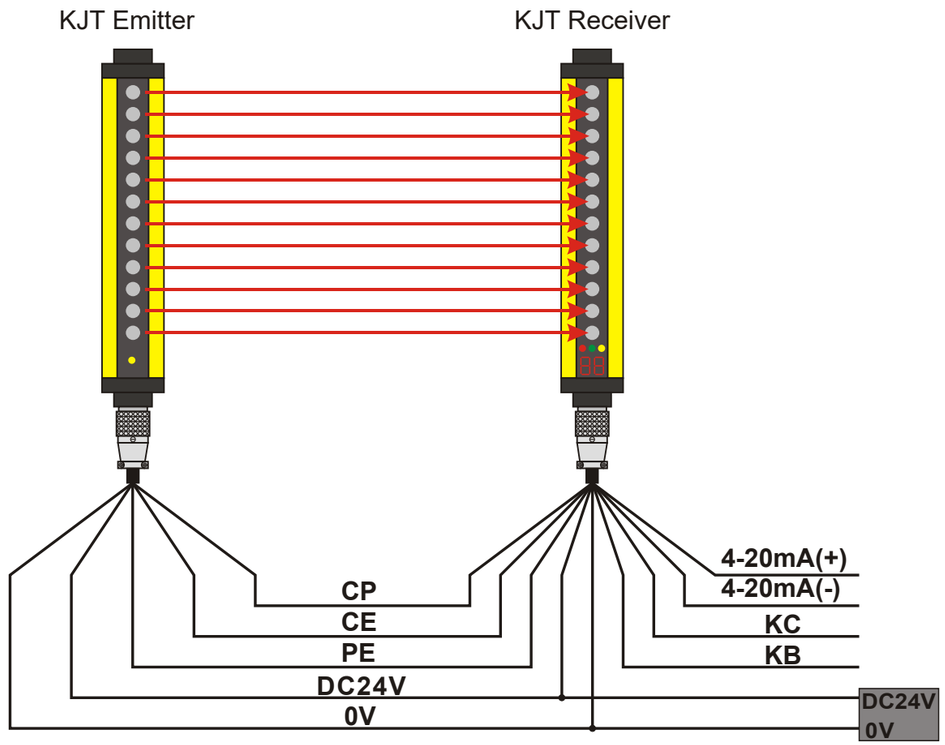
● Light spot data format

The data between the data length and the CRC check byte is the light spot data, followed by the first byte after the data length byte is the light spot number (hexadecimal) byte, followed by the light spot status byte. For the example above, if there are 24 light spots, then the light spot state is 3 bytes and the number of light spot is 1 byte, so the data length is 0x04, that is, 4 bytes. Each light spot state byte represents the state of 8 light spot, and each light spot state is represented by 1bit: 0 means pass, 1 means no (or the path is blocked).

● Light spot state is expressed below in the following table:

Data name	1-8 point state								9-16 point state								16-24 point state							
16 hexadecimal value	0X00								0X3C								0X4C							
Bit address	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7
Point address	1 Point	2 Point	3 Point	4 Point	5 Point	6 Point	7 Point	8 Point	9 Point	10 Point	11 Point	12 Point	13 Point	14 Point	15 Point	16 Point	17 Point	18 Point	19 Point	20 Point	21 Point	22 Point	23 Point	24 Point
2 hexadecimal value	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	1	0	0	1	1	0	0
Point state	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Inter rupt	Inter rupt	Inter rupt	Inter rupt	Pass	Pass	Pass	Inter rupt	Pass	Pass	Inter rupt	Inter rupt	Pass	Pass

● **Output wiring diagram**



Red wire （DC24V）： **Positive pole, connected to the power supply DC24V.**

Black wire （0V）： **Power negative pole, connect to power supply 0V.**

Blue wire （CP）： **Emitter docks with the blue line of the light receiver.**

Yellow wire （CE）： **Emitter docks with the yellow line of the light receiver.**

Purple wire （COM）： **Auxiliary relay output common line.**

Grey wire （ON）： **Auxiliary relay output normal open wire.**

Orange wire （485A） **Analog output RS485A**

Green wire （485B）： **Analog output RS485B**

Olive wire （PE）： **Shielding wire.**

Determination of measurement mode and installation location

Different measurement methods can be determined according to different object sizes and shapes: there are three main ways of measuring light curtain installation.

Baseline measurement mode

The lowest beam of light is positioned at a distance of optical axis away from the base line of measurement(H1), so that the actual measured size basically reflects the actual size of the measured object.

Size of measured object (S) = actual measured size (H).

Actual measurement size (H) = number of blocked beams (N) × optical axis spacing (H1)

Baseline extension measurement mode

The lowest beam of light is positioned at a certain extended distance from the base line of measurement(H2), so that the actual measured size plus the extended distance is basically reflected by the actual size of the measured object after being processed by the back-end program.

Size of measured object (S) = actual measured size (H) + extended distance (H2).

Actual measurement size (H)= number of blocked beams (N-1) × optical axis spacing (H1).

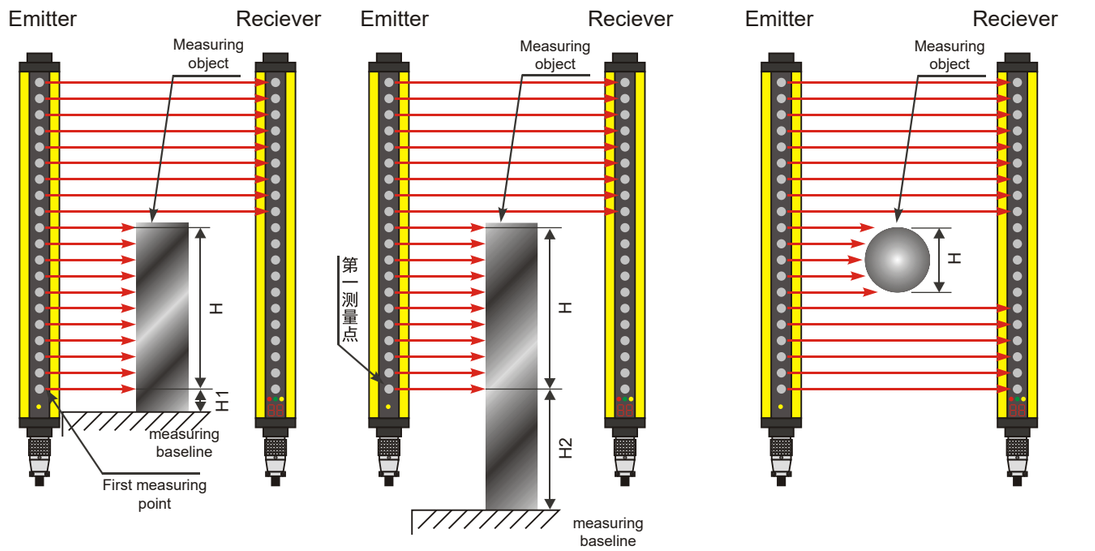
Center line measurement mode

Put the measured position of the measured object as close as possible to the center of the light curtain, so that the actual measured size basically reflects the actual size of the measured object.

Size of measured object (S) = actual measured size (H).

Actual measurement size (H) - number of blocked beams (N-1) × optical axis spacing.

Schematic diagram of measurement mode



Baseline measurement mode (1)

Base line extension measurement mode (2)

Centerline measurement mode

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