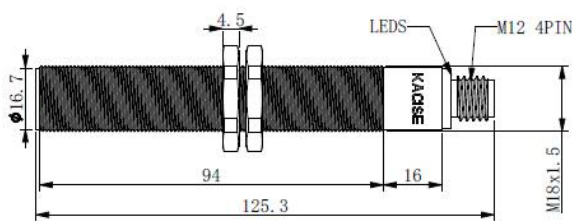


## KUS3000 Series Ultrasonic Sensor

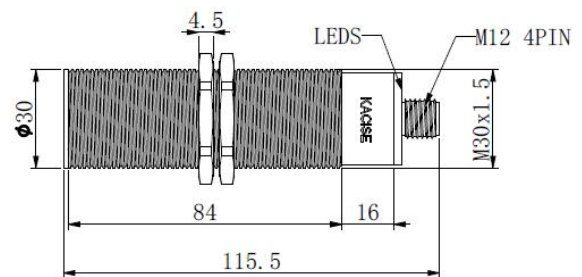


### 1. Dimensions

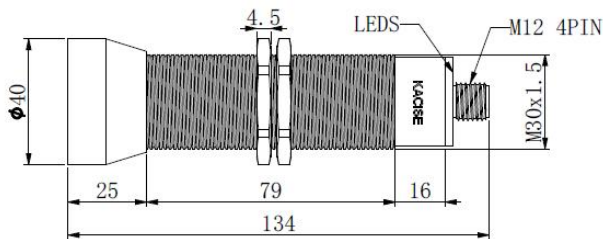
Unit in the diagram is mm.



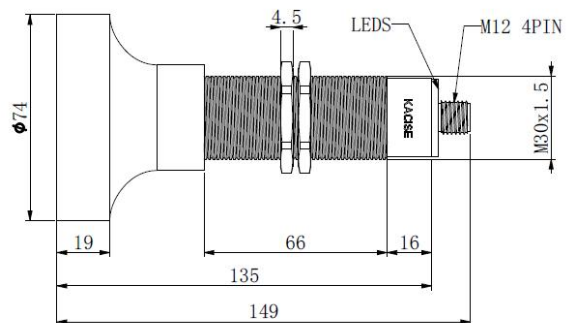
M18 series sensor



M30 type1 sensor



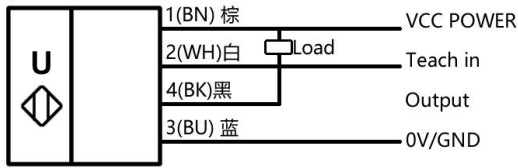
M30 type2 sensor



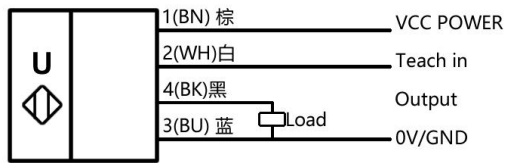
M30 type3 sensor

## 2. Electrical Interface

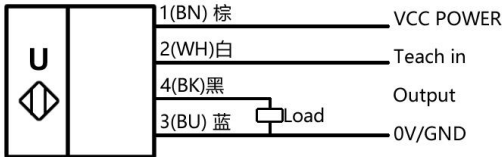
NPN wiring:



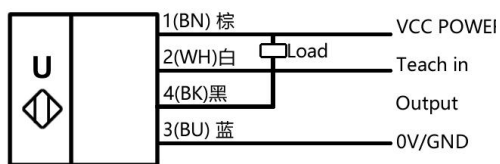
4 - 20 mA version A wiring



PNP wiring:



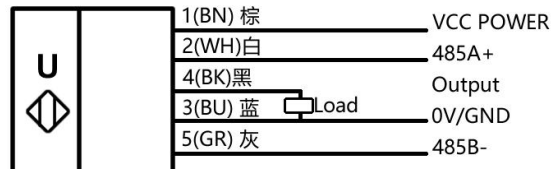
4 - 20 mA version B wiring



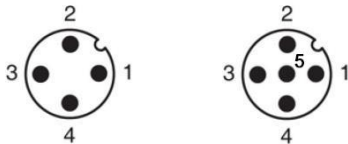
0 - 10V wiring:



RS485 + 4~20 mA wiring:



RS485 wiring:



Note: This product has two cable specifications. The wiring instructions for the two specifications of cables are shown in the following table:

4 pin cable		5 pin cable	
Pin1	Brown	Pin1	Brown
Pin2	White	Pin2	White
Pin3	Blue	Pin3	Blue
Pin4	Black	Pin4	Black
		Pin5	Gray

5 pin cable is used solely for sensors with RS485 + 4~20 mA output.

### 3. Technical Specification

#### General specification

<b>M18</b>	
Sensing range	150... 1000 mm
Adjustment range	150....1000mm
Unusable area	0 ... 150 mm (smaller unusable area customizable)
Response delay	approx. 10 ms

<b>M30-type1</b>	
Sensing range	200... 2000 mm
Adjustment range	200....2000mm
Unusable area	0 ... 200 mm
Response delay	approx. 10 ms

<b>M30-type2</b>	
Sensing range	300... 4000 mm
Adjustment range	300...4000mm
Unusable area	0 ... 300 mm
Response delay	approx. 20 ms

<b>M30-type3</b>	
Sensing range	400... 6500 mm or 600-15000mm
Adjustment range	400...6500mm or 600-15000mm
Unusable area	0 ... 400 mm or 0 ... 600 mm
Response delay	approx. 40 ms

#### Electrical specification

Operating voltage	13 ... 30 V DC
No-load supply current	≤ 45 mA

Low power consumption model (RS485 output only):

Operating voltage	3.3-12VDC
No-load supply current	≤ 15 mA, sleep mode≤1mA, serial port wake-up,

#### Output

Output type	1.PNP switching output, switching mode can be calibrated 2.NPN switching output, switching mode can be calibrated 3.Analog 0-10V output, near and far points can be calibrated 4.Analog 4-20mA output, near and far points can be calibrated 5.RS485 output, programmable 6.RS485 + 4-20mA digital and analog output, programmable
Overload current	200 mA, short-circuit/overload protected
Default setting	M18: Near point A1: 150mm, Far point A2: 1000mm M30 type 1: Near point A1: 200mm, Far point A2: 2000mm M30 type 2: Near point A1: 300mm, Far point A2: 4000mm M30 type 3: Near point A1: 400mm, Far point A2: 6500mm

Voltage drop	≤ 2.5 V
Repeat accuracy	0.5%-1 %
Switching frequency	≤ 13 Hz (high frequency version customizable)
Range hysteresis	5 % of the set operating distance
Temp. compensation range	-40℃-85℃

**Ambient condition**

Ambient temperature	-25...70℃ (248...343K)
Storage temperature	-40...85℃ (233...358K)

**Mechanical specification**

Connection	M12×1 connector, 4-pin M12×1 connector, 5-pin
Protection	IP65, other customizable
Casing material	Nickel-plated copper, other customizable

**LED Indicator**

		Calibration Mode	Normal Operating Mode
Red	On	Fault	Fault
	Off	Normal operation	Normal operation
	Flashing	Indicates that the sensor is locked in the current echo loss or infinite distance state, and the user can switch to the next calibration state.	---
Yellow	On	---	object detected
	Off	---	object lost
	Flashing	Indicates that the current calibration state is locked, and the user can switch to the next calibration state.	Echo loss and echo detection alternate, indicating the sensor has reached its maximum range.
Green	On	Power supply normal	Power supply normal
	Off	Power supply abnormal	Power supply abnormal
	Flashing	Indicates that the user can perform calibration settings.	---
	Within 5 minutes of power-on, the green light will flash, indicating that the user can perform output calibration. After 5 minutes, the green light will remain steady, indicating that the sensor can no longer receive calibration instructions.		

Note: When using the 4-20mA version B analog output, the wiring for the ammeter differs from the 4-20mA version A sensor. Since the version B output is powered by VDD (as shown in Figure 1), the ammeter should be connected between the power supply terminal and the output terminal. The wiring method is shown in Figure 2.

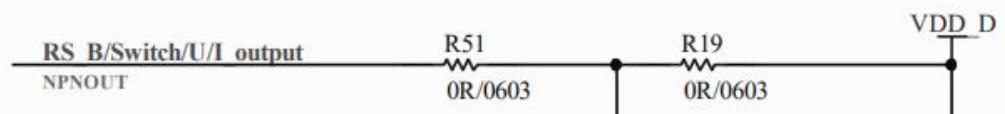


Figure 1

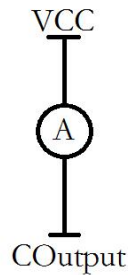


Figure 2

## 4. Description of Sensor Functions

### Setting and adjustment of switching points/near far points for switching/analog output sensor

The switch and analog output can be set using the calibration terminal. Specifically, there are 8 working modes that can be set.

Each setting method is divided into the following steps.

Step 1. The user selects a distance set by himself, or puts the sensor into the lost wave state.

Step 2. Connect the calibration terminal to the power supply or GND, and keep it connected until the yellow light flashes (if it is a lost wave state, the red light flashes).

Step 3. The user selects the second distance set by himself, or puts the sensor into the lost wave state.

Step 4. Connect the calibration terminal to GND or power supply (a different state from the second step), and keep it connected until the yellow light flashes (if it is a lost wave state, the red light flashes).

### There are 8 working modes for switching output:

1. Window NO mode (For analog output: positive linear working mode or distance measurement mode).
2. Window NC mode (For analog output: negative linear working mode or level measurement mode).
3. Single point normally open mode.
4. Single point normally closed mode.
5. Single point normally open with large hysteresis gap mode.
6. Single point normally closed with large hysteresis gap mode.
7. Presence detection normally open mode.
8. Presence detection normally closed mode.

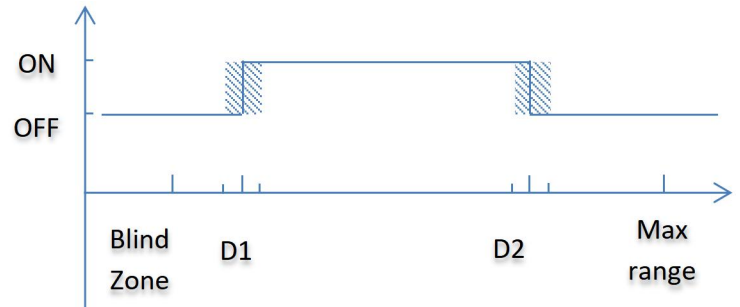
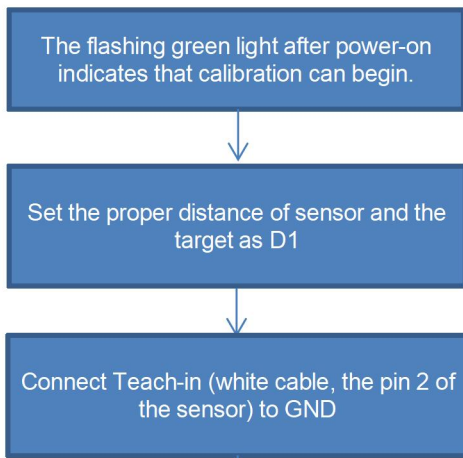
### Description of RS485 Output Model:

There are 3 working modes,

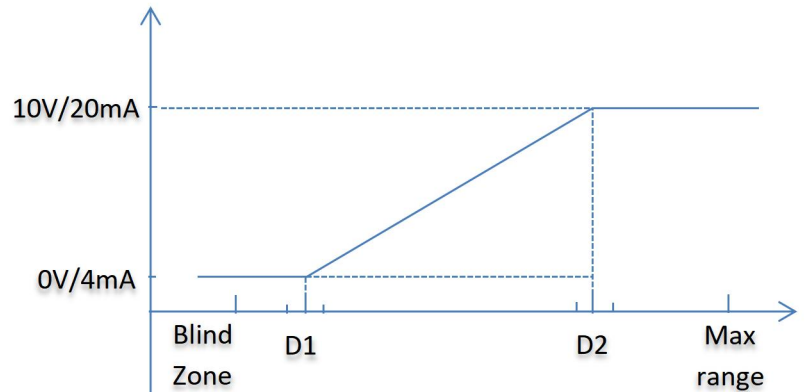
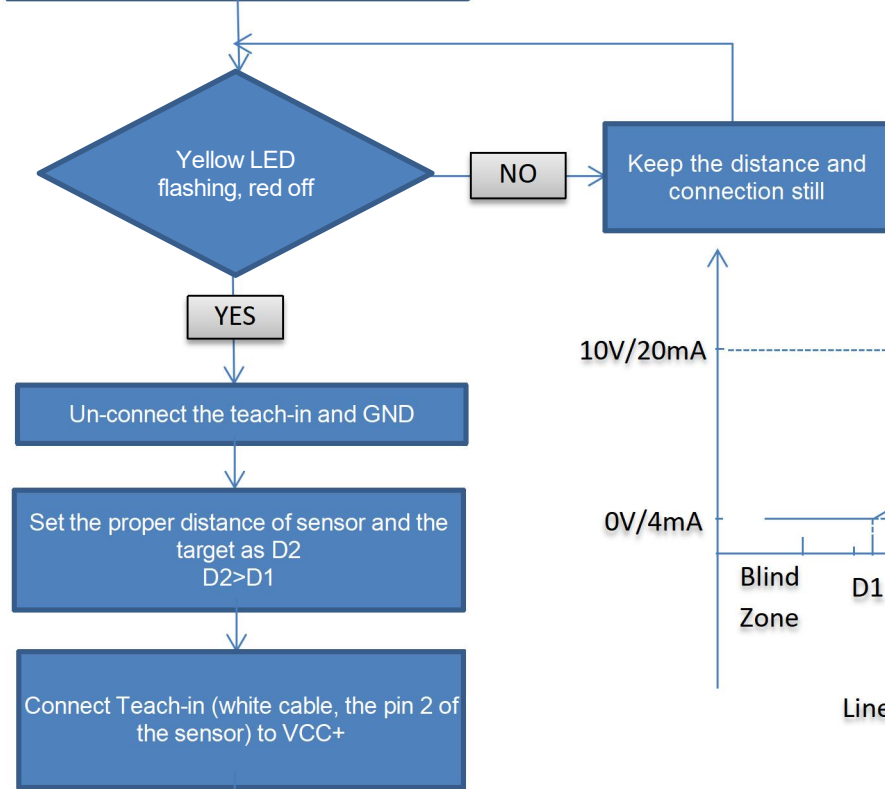
1. Automatic measurement mode, the sensor continuously measures the liquid level and distance, and the user can read the measurement results at any time through the RS485 interface.
2. Every time the user initiates a RS485 communication, the sensor will actively initiate a measurement and report the results.
3. Sleep mode, sensor enters sleep mode, the user first wakes up the sensor through the RS485 interface, and then initiates a measurement and obtains the results before the sensor goes to sleep again.

**Eight working status setting guides**

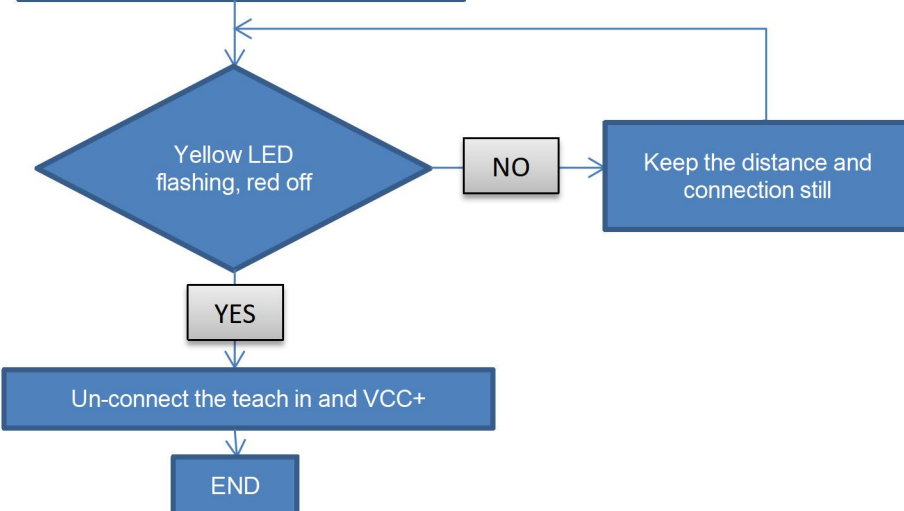
1), Window NO mode (analog output sensor is in positive linear working mode or distance measure mode)



Default 5% Hysteresis gap  
Switching output diagram



Linear output and program diagram

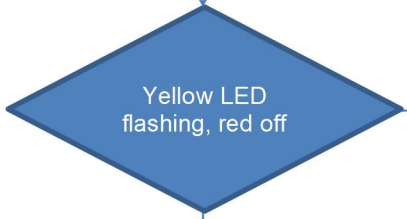


2), Window NC mode (analog output sensor: negative linear working mode or level measurement mode).

The flashing green light after power-on indicates that calibration can begin.

Set the proper distance of sensor and the target as D2

connect Teach-in (white cable the pin 2 of the sensor) to GND



NO

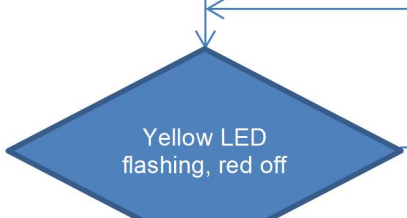
Keep the distance and connection still

YES

Un-connect the teach-in and GND

set the proper distance of sensor and the target as D1  
D2 > D1

connect Teach-in (white cable the pin 2 of the sensor) to VCC+



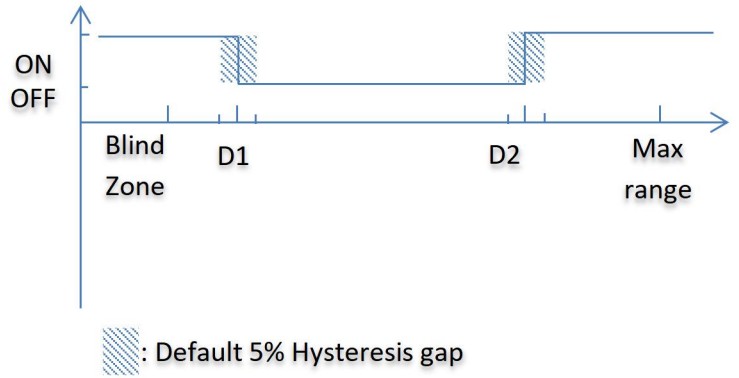
NO

Keep the distance and connection still

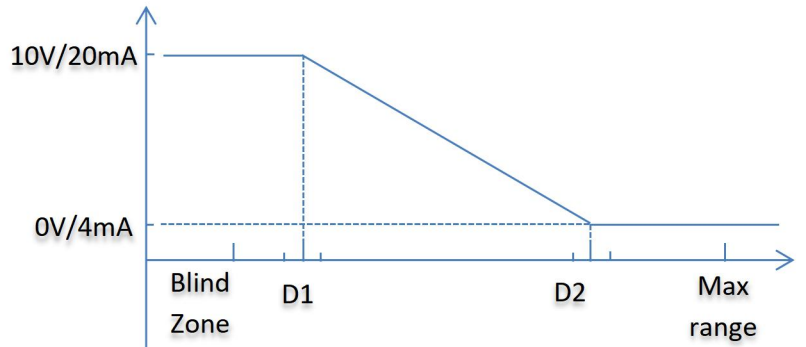
YES

Un-connect the teach-in and VCC+

END

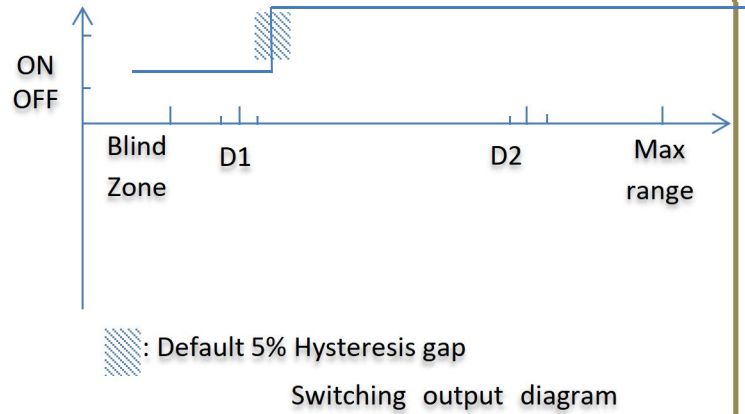
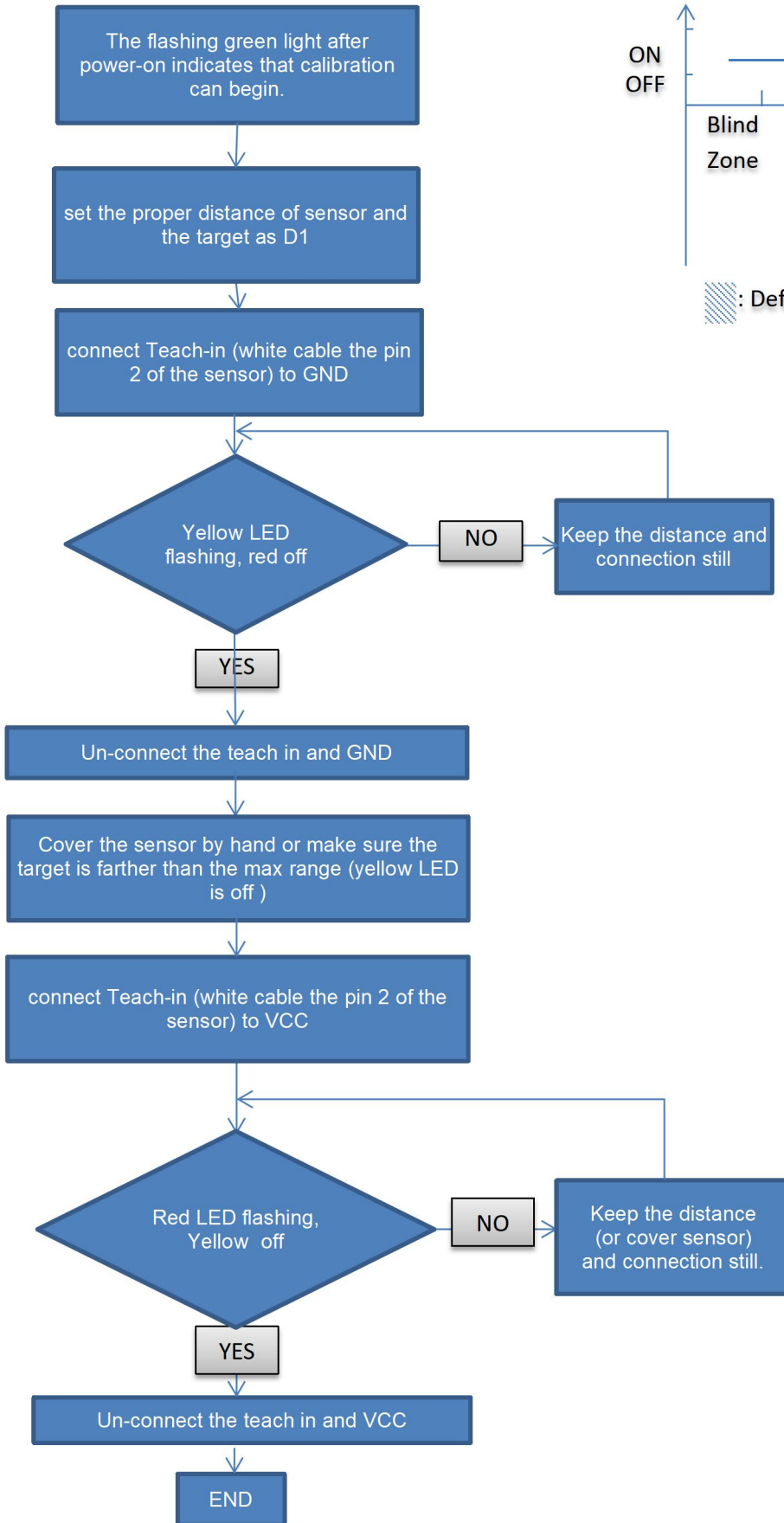


Switching output diagram



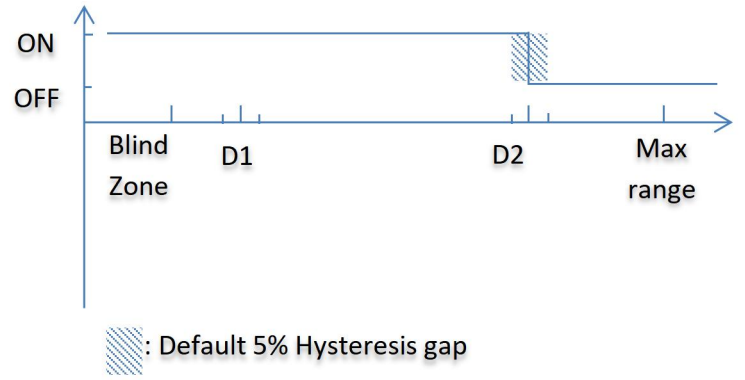
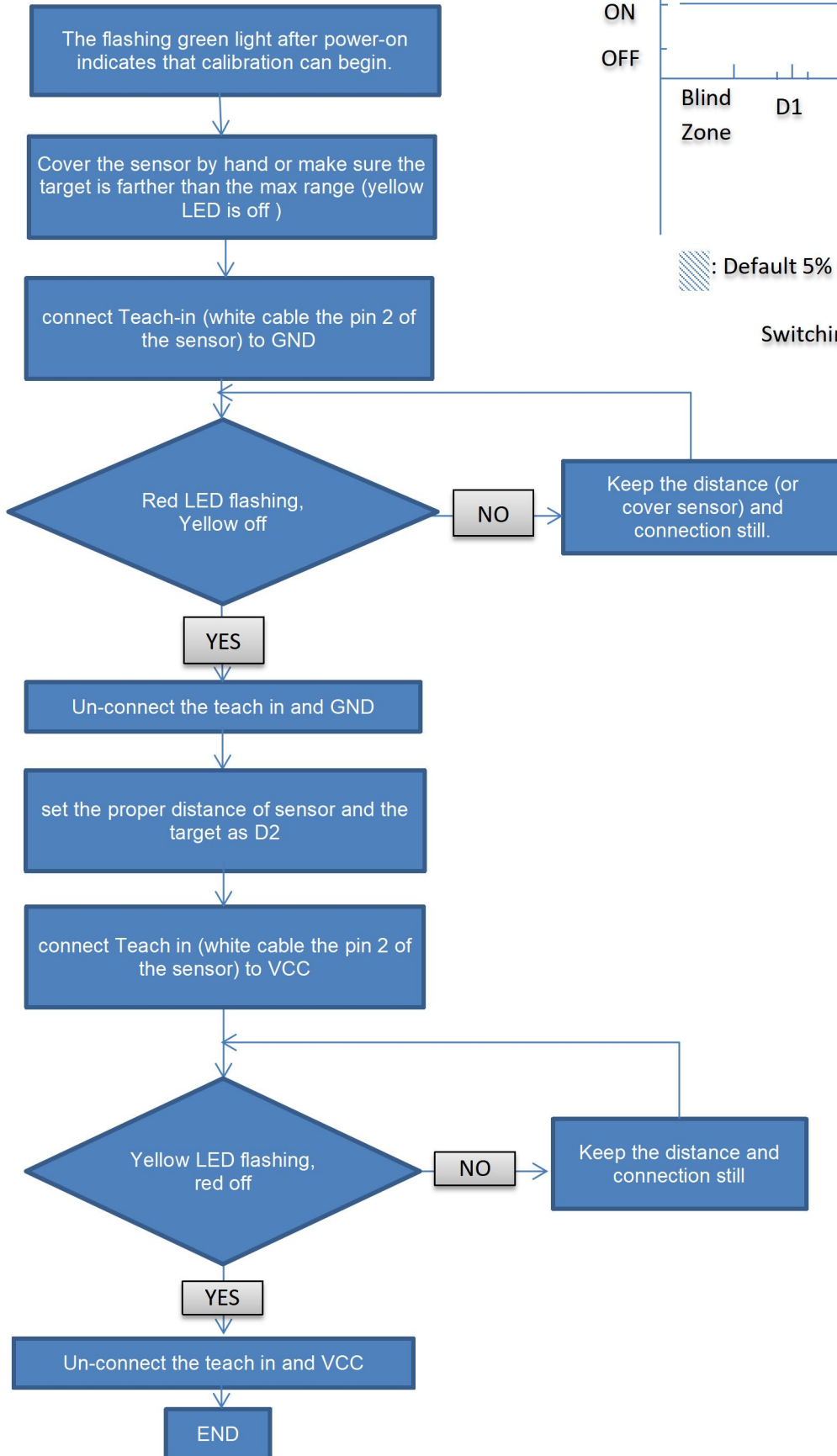
Liner output and program diagram

3), Single point normally open mode.





4), Single point normally close mode.



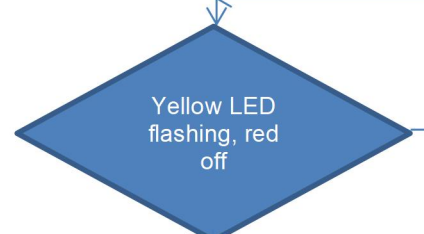
Switching output diagram

5) Single point normally open with large hysteresis gap mode.

The flashing green light after power-on indicates that calibration can begin.

Set the proper distance of sensor and the target as D1

connect Teach-in (white cable the pin 2 of the sensor) to VCC



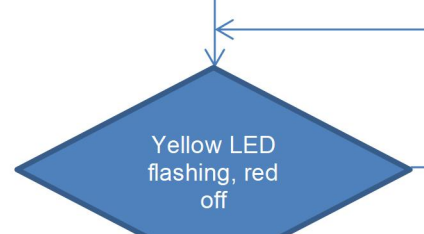
Keep the distance and connection still

YES

Un-connect the teach in and VCC

set the proper distance of sensor and the target as D2  
D2 > D1

connect Teach in (white cable the pin 2 of the sensor) to GND

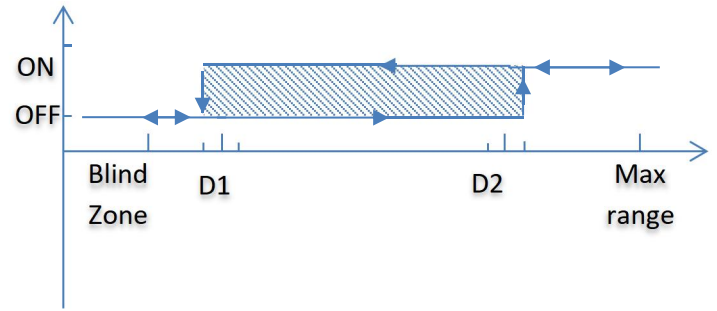


Keep the distance and connection still

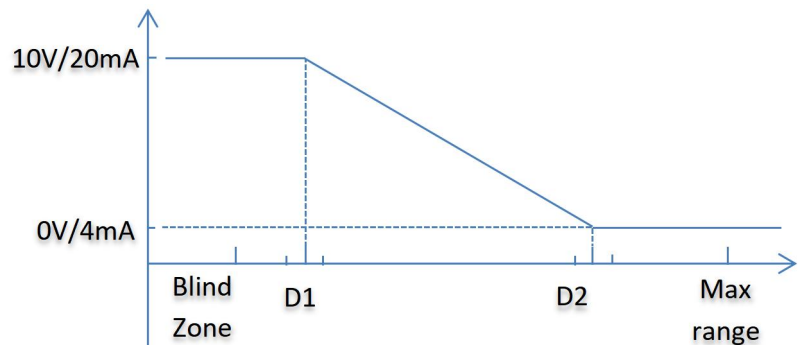
YES

Un-connect the teach in and VCC

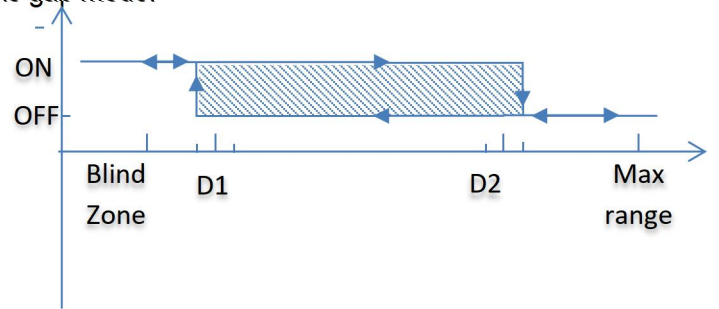
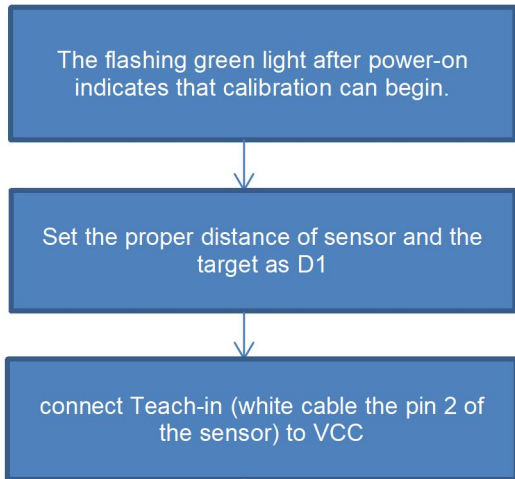
END



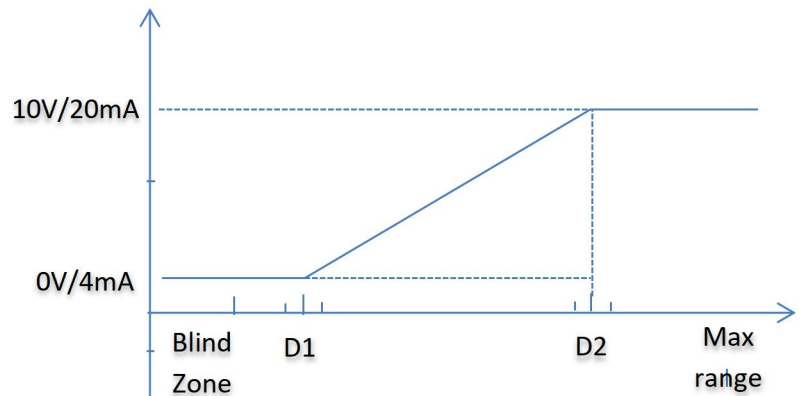
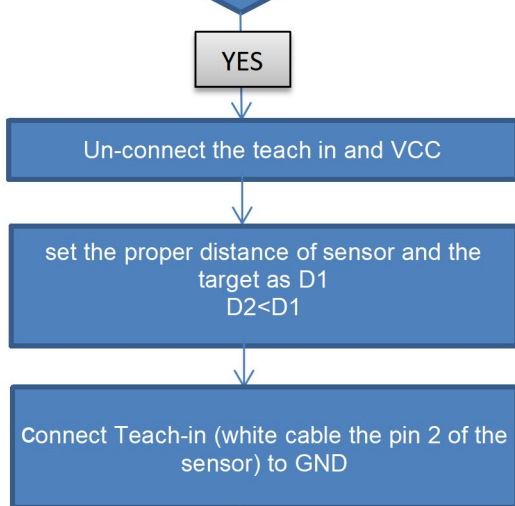
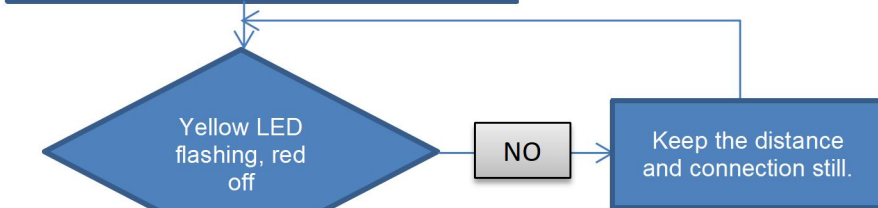
: Hysteresis gap  
Switching output diagram



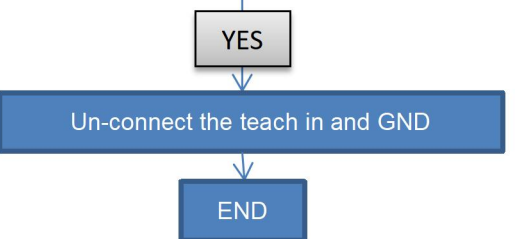
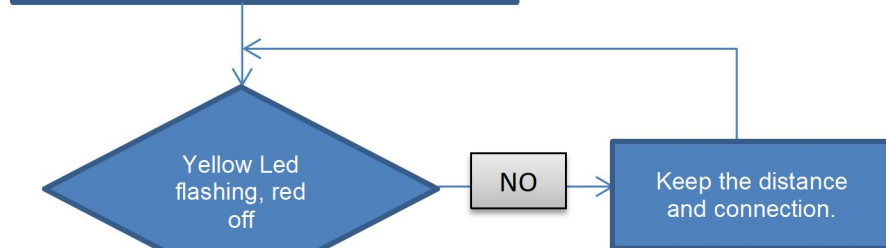
6) Single point normally closed with large hysteresis gap mode.



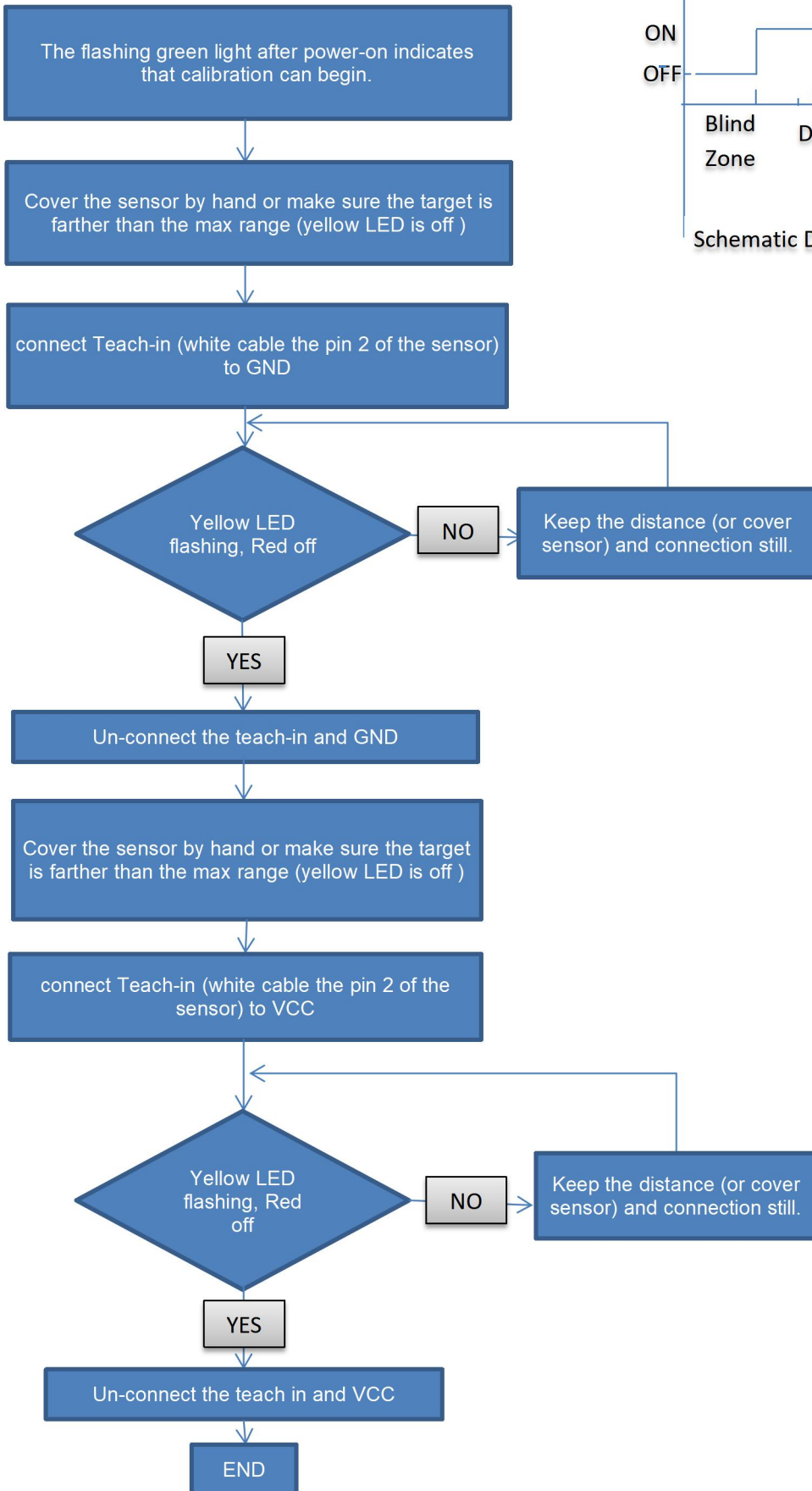
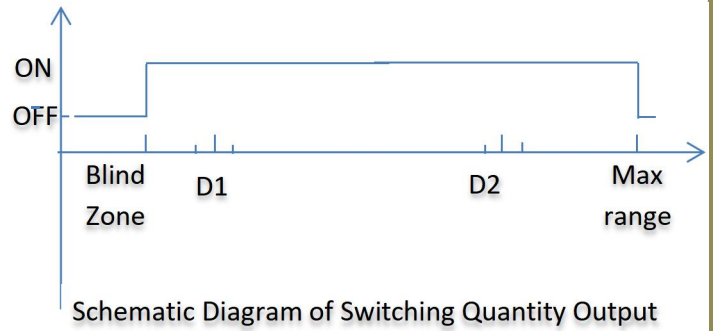
▨: Hysteresis gap  
Switching output diagram



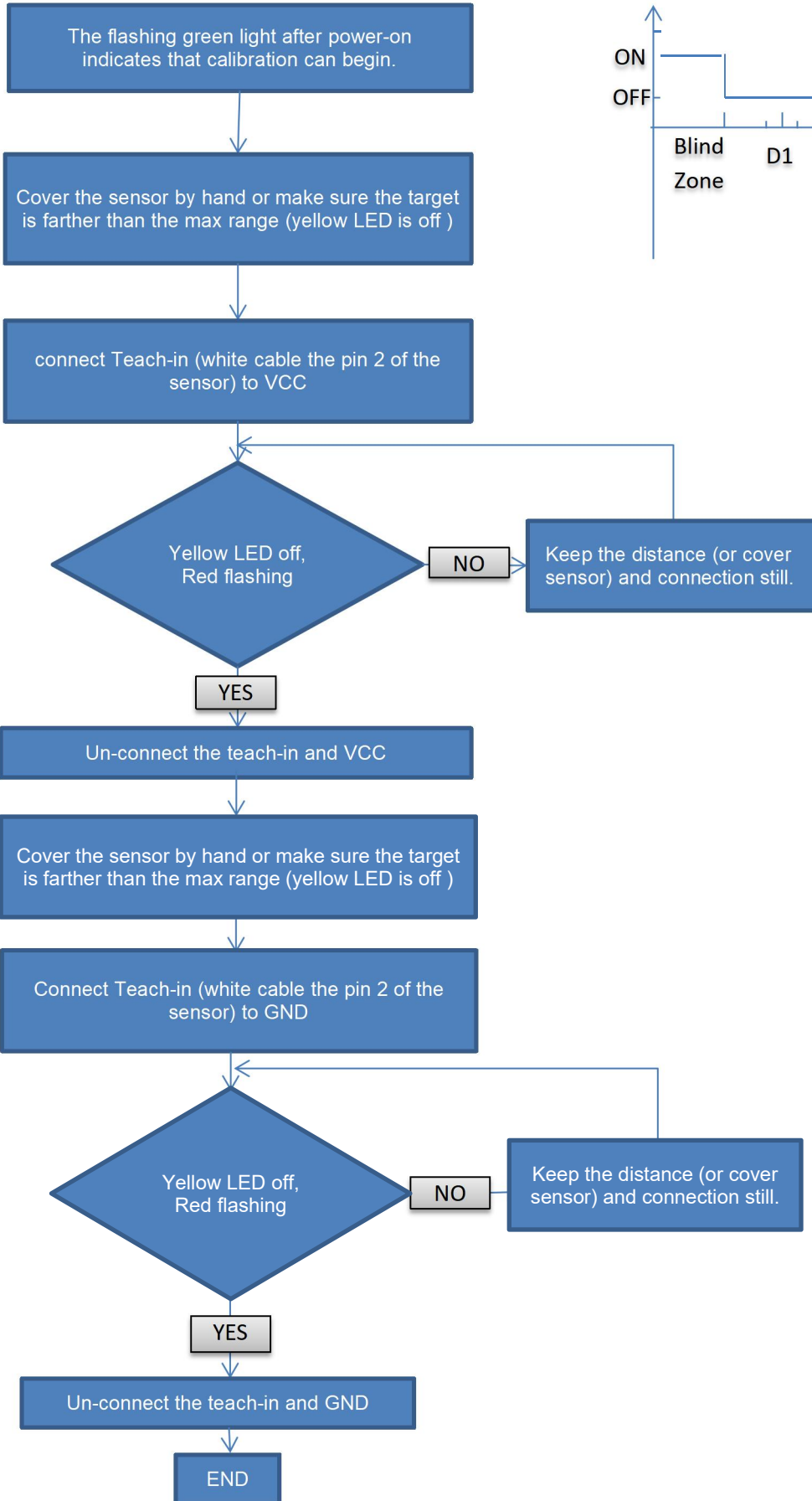
Linear output and Program diagram



7) Presence detection normally open mode.



8) Presence detection normally closed mode.



## 5. Installation notes

Protect the sensor surface to prevent damage during installation. If the sensor operates in environments with volatile gases, heavy dust, or severe condensation, regularly clean the sensor surface to avoid reduced sensitivity or malfunction. Avoid overtightening the installation threads, as excessive pressure on the sensor can lead to improper functioning.

## 6. Ordering information

KUS	Type	OUTPUT	Max range	Description
	M18	M18 housing, 1000mm range		
	M30-Type1	M30 housing, 2000mm range		
	M30-Type2	M30 housing, 4000mm range		
	M30-Type3	M30 housing, 6500mm range. 15000mm range customizable		
	Customize	The housing supports user customization.		
		NPN		
		PNP		
		10V	Output 0-10V, Power supply: 12-30VDC	
		5V	Output 0-5V, Power supply: 12-30VDC	
		mA	Output 4-20mA, Power supply: 12-30VDC	
		RS485	Output RS485-modbus, Power supply: 3.3V-30V	
		RS485+mA	Output 4 - 20mA + RS485, Power: 12-30VDC	
			XXX mm	The customer should specify the linear range or switching range, and the settings can be made during factory shipment.
KUS	M18	RS485	1000mm	