- 5W bi-directional switch control
- Industrial remote wireless 4 paths switch control module

Product Specification



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Note: Revision History

Revision	Date	Comment
V1.0	2015-5-20	First release
V1.1	2017-06	Logo updated
V1.2	2020-12	Update description
V1.3	2024-8	Correct DIP description
V1.4	2024-9	Update frequency band
V1.5	2025-02	Update frequency band and other information

1. Overview

SK509 is an industrial four channels wireless switch control module with pairing function, it provides maximum four channel signal input and maximum four channel control output. It features in simple interface and reliable performance. The parameters can be modified by PC software / UART command / remote controller (SK509-S). DIP switch on the module can used to change operating frequency (maximum 16 group), operation mode etc. Using this module, user can replace wired device with the wireless connection, which significantly reduce the cost and save much time.

SK509 strictly uses lead-free process for production and testing, and meets RoHS and Reach standards.

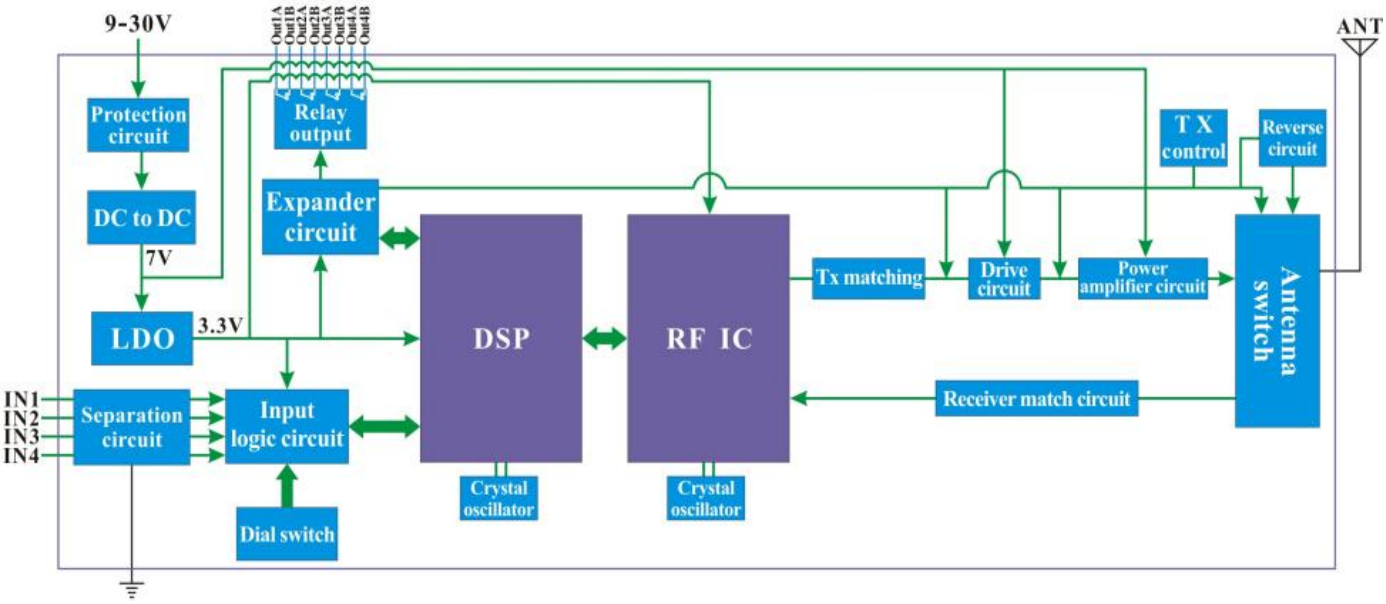
2. Features

- Distance up to 8Km in open area
- 16 channels to choose
- Parameters set wirelessly by PC
- Real time / Timing mode
- GFSK modulation
- Antenna matches automatically
- Frequency band: 433/470MHz
- Sensitivity up to -121 dBm
- Max. output power：5 W
- Working voltage: 9~30 V
- Working temperature：-40 ~ +85 °C
- Weight：180g

3. Application

- Remote switch control
- Security system
- Home automation remote sensing
- Wireless remote telemetry
- Building automation and security
- Access Control System

4. Block Diagram



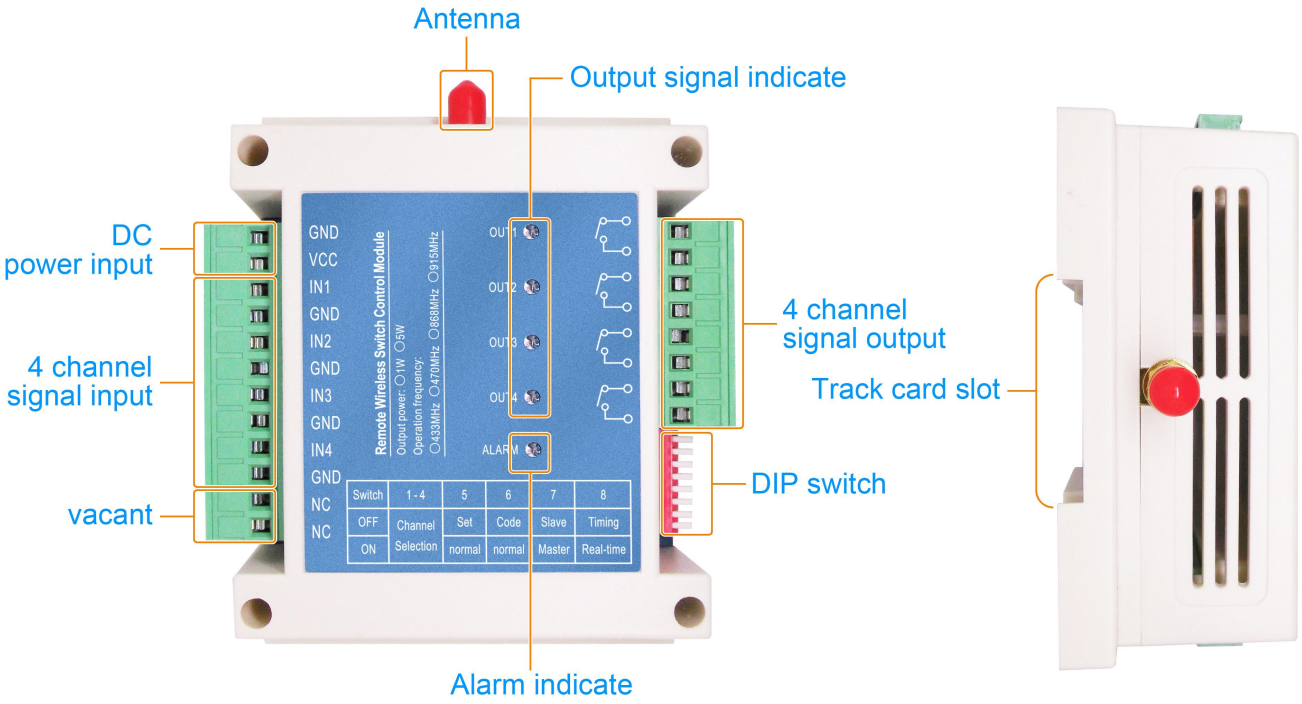
5. Electrical Characteristics

Note: below parameters were tested under voltage 12V and temperature 25℃

Parameter	Min	Typ.	Max	Unit	Condition
Condition					
Working voltage	9	12	30	V	
Working temperature	-40	25	+85	℃	
Current consumption					
Rx current		<20		mA	
Tx current		<2		A	
Standby current		<5		mA	@12V timing mode Master don't send message
RF parameters					
Output power		37		dBm	
Sensitivity		-121		dBm	@2400

6. Overview

Name of each part are as below：



7. DIP definition

DIP function description:

DIP8—communication mode selection

ON – real-time mode (In this mode, output sync to the input immediately once the input state changed)

OFF - timing mode (output sync to in the input at set time interval)

DIP7 - master/slave selection

ON - the master

OFF - the slave

DIP6 – Pairing Mode Selection

ON -Non-Pairing Mode

OFF- Pairing Mode (In this mode, the host channel in instant mode can pair with the slave channel. Only the paired channels can be controlled)

DIP5 - mode selection

ON - normal working mode

OFF - setting mode (connect module to PC by SK108-S, set the parameters)

DIP4 ~ 1 - working frequency channel selection, 16 channels in total (default channel interval is 0.5M), frequency can be reset by PC.

Relationship between DIP switches and working frequency channel:

DIP NO.	Channel No.	DIP NO.	Channel No.	DIP NO.	Channel No.	DIP NO.	Channel No.
	1		5		9		13
	2		6		10		14
	3		7		11		15
	4		8		12		16

★ Note:
If any DIP switch changed, power off then power on the module again to make the set valid.

8. Working mode

1) Power on reset

When powered on, all relays open, the LED is off, alarm LED blink once.

2) Real-time working mode

In real time mode, both the master and slaver will send a inquiry signal at set time interval (default time is 3minutes) , the other side , master or slaver will reply the synchronized message. If this communication failed for continuous 3times, the alarm will light on to indicate, the related output will resume to open state；

In real-time mode, if modules never paired before， it is in non paired mode.

Each module has four independent input and four independent output. In real-time mode, the change of any input of the four channels will trigger the transmission, in other side the corresponding relay of the module will be synchronized after got the signal, then it returns a acknowledged signal. If no acknowledged signal come to the triggered modules, the alarm LED will light on. All the output relays will be resumed open if no acknowledge signal received for continuous 3 times inquiry.

★ Input and output status under normal working mode:

The logic relationship of the module as below:

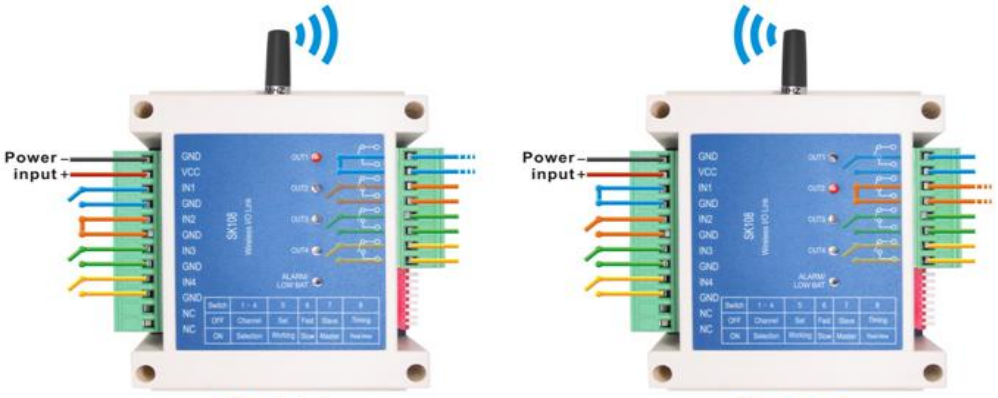
Real-time mode（Bi-communication）			
Master input		Slave output	
IN1	Open or pull high	OUT1	Open
	Short		Close
IN2	Open or pull high	OUT2	Open
	Short		Close
IN3	Open or pull high	OUT3	Open
	Short		Close
IN4	Open or pull high	OUT4	Open
	Short		Close
Slave input		Master output	
IN1	Open or pull high	OUT1	Open
	Short		Close
IN2	Open or pull high	OUT2	Open
	Short		Close
IN3	Open or pull high	OUT3	Open
	Short		Close
IN4	Open or pull high	OUT4	Open
	Short		Close

Timing mode（One way communication）			
Master input		Slave output	
IN1	Open or pull high	OUT1	Open
	Short		Close
IN2	Open or pull high	OUT2	Open
	Short		Close
IN3	Open or pull high	OUT3	Open
	Short		Close
IN4	Open or pull high	OUT4	Open
	Short		Close
Slave input		Master output	
IN1	X	OUT1	Open
IN2	X	OUT2	
IN3	X	OUT3	
IN4	X	OUT4	

For example, communication between modules A and B,

the 4 output of module A is corresponding to the 4 input of module B,

the 4 output of module B is corresponding to the 4 input of module A, shown as below:



The transceiving between Module A and B is mutual, the input of Module A is corresponding to the output of Module B, the input of Module B is corresponding to the output of Module A.

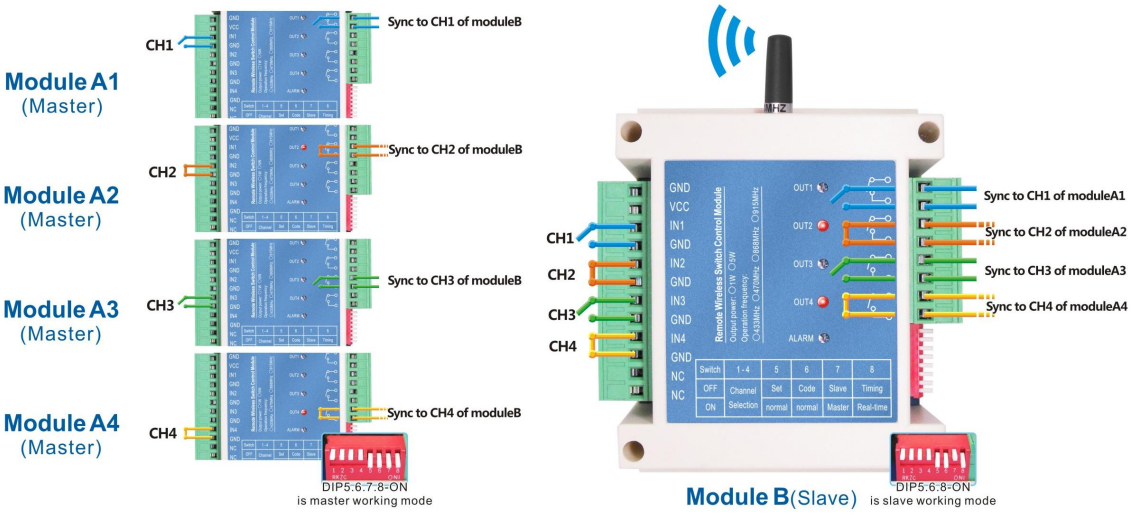
In real time mode,SK509 can work in pairing mode or non pairing mode. SK509 will work at pairing mode if it has been paired with any other SK509. Paired SK509 can only work with other paired SK509. It can't communicate between paired SK509 and non paired SK509.

For paired SK509, it is 2 way communication, the master can control the slave. Slave can control the master. But slave can't control the slave and master can't control the other master.

In pairing mode, the status change of input (master or slave) will synchronized to the output (paired slave or paired master).

If SK509 has not been paired with other SK509, or been unpaired, it works in non pairing mode. In non pairing mode, the change of input channel will synchronized to the same output channel in other side.

★ Application



Module A and Module B is Master and Slave relationship, INX input of Module A is related to the OUTX output of Modula B

a. How to pair the module

1. Power off the master and slave.
2. Pull the DIP6 to [OFF] side and DIP 5 to [ON] side
3. Power on the slave firstly , the alarm LED light on to indicate it is ready for pairing.
4. Power on the master , the pairing operation will start automatically, both alarm LED will light off when succeed pairing.
5. Pull both DIP6 of the master and slave to [ON]
6. Power off both the master and slave
7. Power on both master and slave for operation.

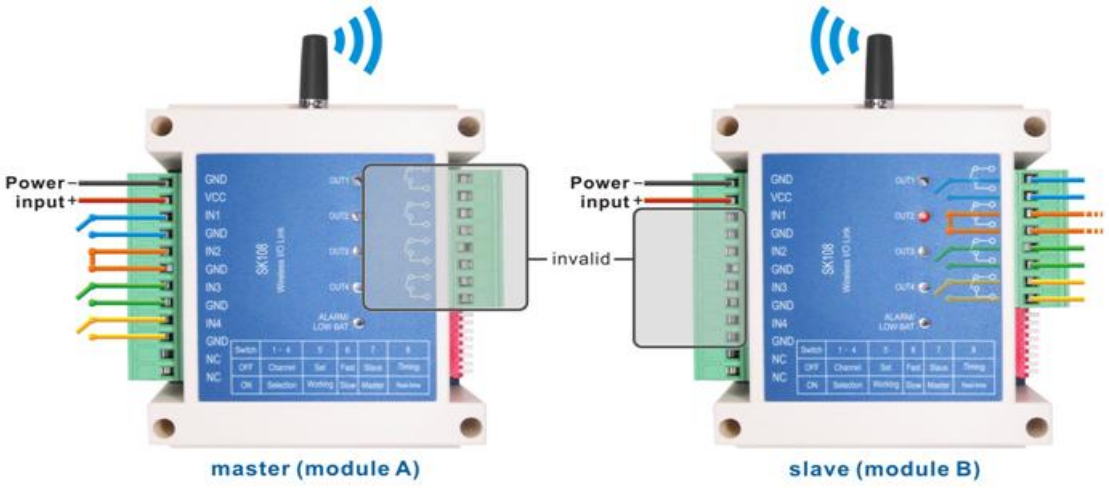
b. How to unpair the module

1. Pull the DIP7 of the master to [OFF] side
2. Pull the DIP7 of the slave to [ON] side
3. Power off both the master and slave
4. Power on both master and slave for operation.

3) Timing working mode

In timing mode, the module works in master mode or slave mode. The communication is one way. Communication is from master to slave. The master transmits the wireless signal to slave regularly, the corresponding relay of the slave will be synchronized after got the signal.

The module can worked in fast mode or slow mode by changing the dip switch. The time interval of the fast or slow mode can be configured by PC software (default is 2s in fast mode, 30s in slow mode). The alarm LED will light on and all the four output relay will resume to 0（all relays are in open state） if no synchronized message received for continuous 5 times interval. The LED will indicate low battery and all the four output relay will resume to 0（all relays are in open state）if get low battery signal from the other side.



Communication is from master to slave, the 4 input of module A is corresponding to the 4 output of module B. The 4 output of master and the 4 input of slave are invalid.

4) Configuration mode:

In configuration mode, user can configure the parameters by SK509-S or PC software. The configurable parameters include NET ID,16 groups frequency channels, inquiry time interval (only available in real time mode), master transmitting time interval(Only available in timing mode), modules can communicate with each other when parameters matched. PC software show as below：





✧ **CHANNEL**

Each module has 16 frequency channels, users can choose one of the channels to use via DIP switch, the corresponding frequency of the 16 channels can be modified via PC software. We suggest users using the default frequency value, or set the frequency value near the centre frequency to get better performance.

✧ **Inquiry Time**

This parameter is used in real time mode. The slave send the inquiry signal to master with this fixed inquiry time interval. 1 byte length, unit is minute, range is 1~30, count as 30 when over 30.

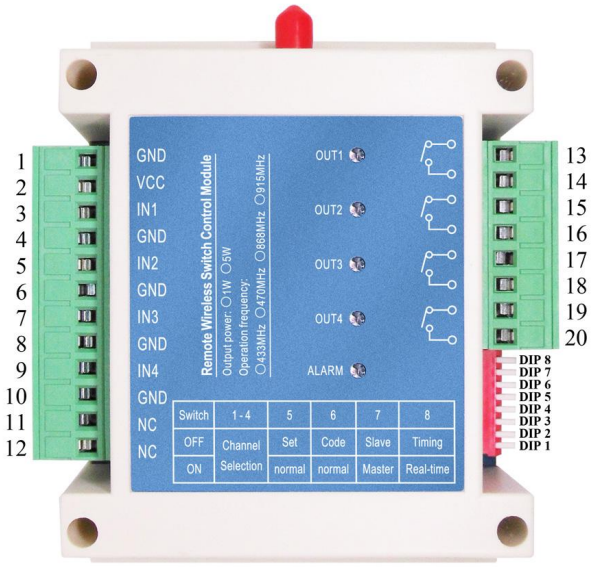
✧ **ID Address**

This parameter is for configuring the ID address of the module, each module should have its unique ID address.

✧ **Time interval in timing mode**

It is for setting the time interval under the timing mode, unit is second. Default is 1s.

9. Pin definition

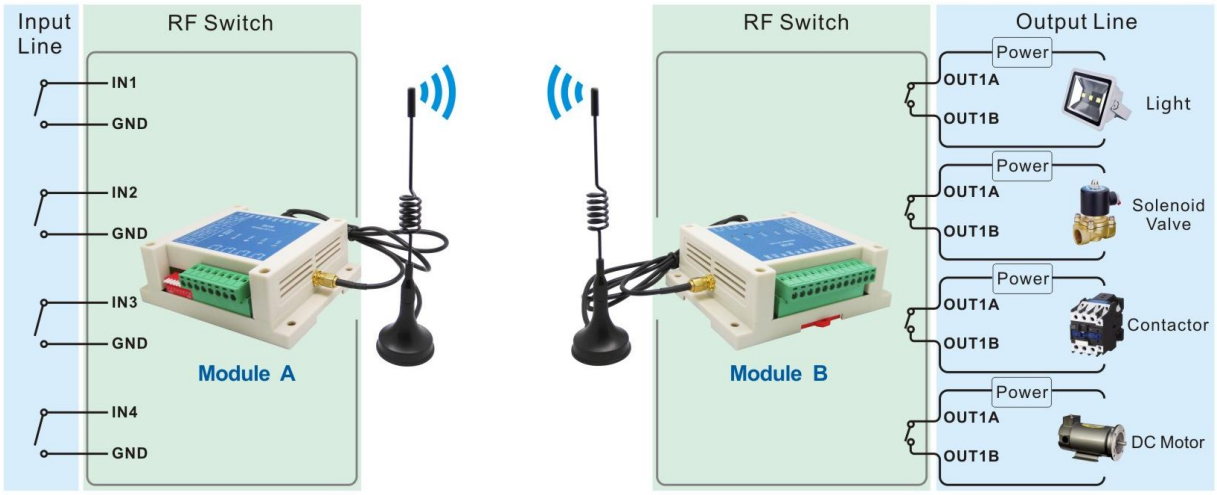


Pin NO.	Pin	Description
1	GND	Connect negative power
2	VCC	Connect positive power
3	IN1	Ch1 switch input, internal pull up
4	GND	
5	IN2	Ch2 switch input, internal pull up
6	GND	
7	IN3	Ch3 switch input, internal pull up
8	GND	
9	IN4	Ch4 switch input, internal pull up
10	GND	
11	NC	Reserved, Non-Connected
12	NC	Reserved , Non-Connected
13	OUT1	Ch1 relay output
14		
15	OUT2	Ch2 relay output
16		
17	OUT3	Ch3 relay output
18		
19	OUT4	Ch4 relay output
20		

10. Application connection

The input port is pulled up internally, leave open or connect with 3.3V will result in high level, it is low level when connect to GND.

High level will make the output of the other side short out. And low level will make the output of the other side open. Below is regular connection：



Shorts between INx of A and GND, OUTx relay of B will be actuation, Open INx from GND, OUTx relay of B will open.

11. Accessories

1) Antenna

The antenna is very important for RF communication, its performance will affect the communication directly. Module needs antenna in 50ohm. Common antenna has rubber straight/ elbow/ foldable rod and sucker antenna and etc. Users can order accordingly. To ensure module in the best performance, we suggest to use the our antennas.



★ To ensure modules get the best performance, user must obey the following principles when using the antennas：

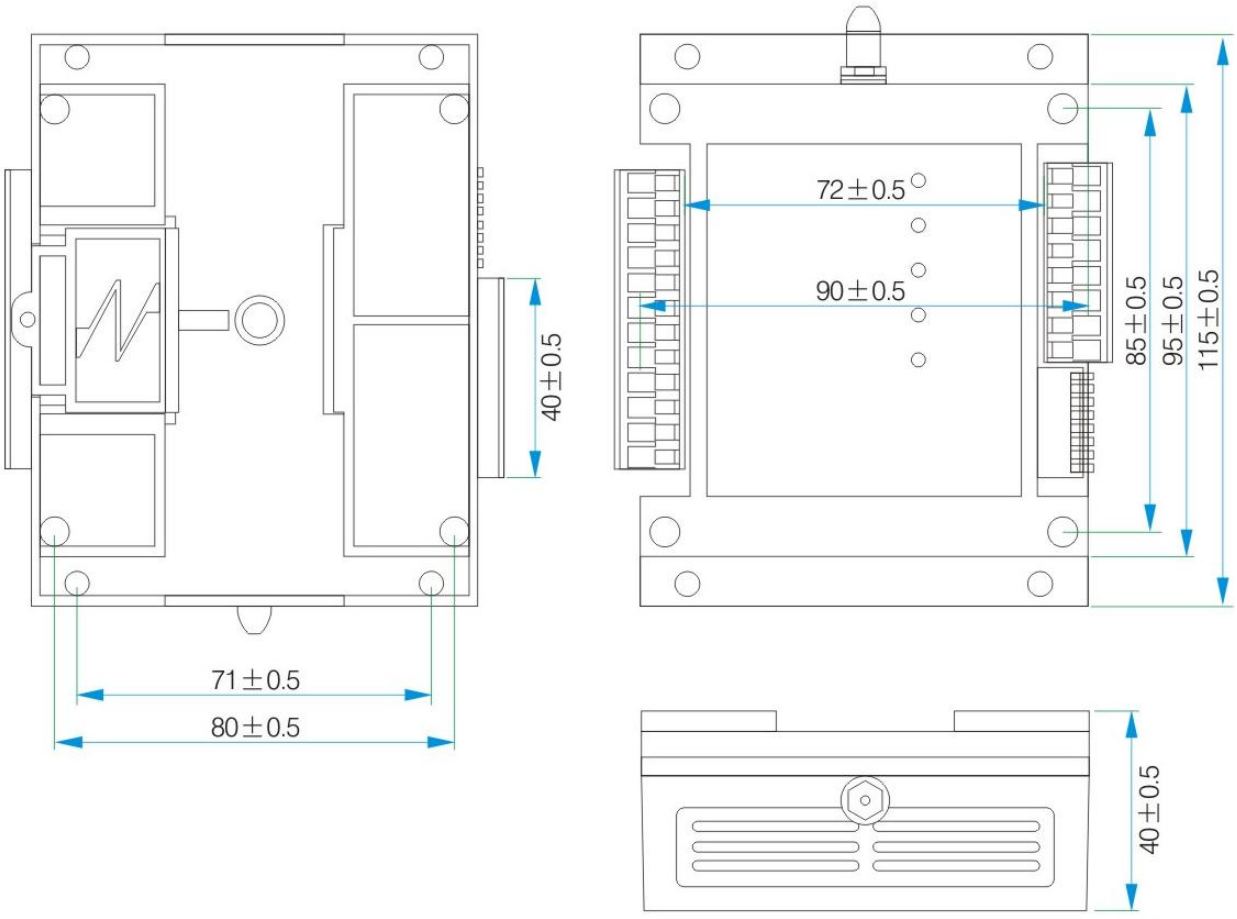
- Put the antenna away from the ground and obstacle as possible as you could；
- If you choose the sucker antenna, pull straight the lead wire as possible as it can be, the sucker under arches should be attached on the metal object；

2) Power supply

The standard power supplier for this module is DC 12V(suggest to use voltage in 1A or higher), module don't work when power lower than 9V. Power supplier is the important part of the communication system, its performance will affect the communication directly as well. To make sure module in the best performance, we suggest to use our power supplier.



12. Mechanical dimension(Unit:mm)



13. Order information

SK509-433
└ Centre frequency

For example: If the customer needs 433MHz, part number of released order shall be: SK509-433

SK509 has below versions：

Order number	Product type
SK509-433	433MHz working frequency
SK509-470	470MHz working frequency

14. FAQ

a) Why modules can't communicate?

1) Check if power supply is connected correctly

2) Check if the frequency and channels of each module are the same

3) Check if module is damaged (if the LED flash when powered on?)

4) Check if module in normal communication mode;

b) Why communication distance is not so far as expected?

1) Check if the Power supply is stable ;

2) Check if the antenna well matched and install properly;

3) Check if the surrounding environment is good;

4) Check if strong same frequency interference exist;