onbon 仰邦科技

BX-QX Rev.C　Specification

Version：V1.2　　Release date：2023.10.27

Catalog

Brief instruction

BX-QX Rev. C environmental comprehensive sensor has a compact and light weight appearance, making it easy to carry and assemble.

It integrates multiple sensor functions and can accurately measure temperature, humidity, noise, PM2.5/PM10, TSP, atmospheric pressure, and Illumination values. The casing is made of high-quality aluminum alloy profiles, and the exterior is treated with electroplating and spraying, which has good anti-corrosion and corrosion resistance characteristics, ensuring that the transmitter can be used for a long time without rusting and scratching. At the same time, the internal bearing system is stable, ensuring the accuracy of information collection. Widely used for environmental value measurement in fields such as greenhouse, environmental protection, meteorological stations, ships, docks, aquaculture, etc.

Can be used in conjunction with BX sixth generation tri color series products and BX-Y and C series products.

Product photos

Function instruction

1. The meteorological comprehensive sensor BX-QX Rev. C is suitable for environmental detection, integrating noise acquisition, PM2.5/PM10, TSP, brightness, atmospheric pressure, temperature and humidity. It is installed in a louver box and adopts the standard MODBUS-RTU communication protocol with RS485 signal output. The communication distance can reach up to 2000 meters.

2. Widely applicable to various occasions that require measurement of environmental temperature and humidity, noise, PM2.5/PM10, Illumination , atmospheric pressure, etc. It is safe, reliable, aesthetically pleasing, easy to install, and durable.

3. The product supports wireless WiFi communication and can be controlled and managed through the "BXSensor" mobile app. The app software is easy to operate and easy to learn. The APP supports sensor settings, communication password settings, and 3. Modbus setting function.

4. The product is small in size, light in weight, made of high-quality UV resistant materials, and has a long service life.

5. Using high-sensitivity probes, the signal is stable and the accuracy is high.

6. The key components are made of imported components, which are stable and reliable. They have the characteristics of wide measurement range, good linearity, good waterproof performance, easy use, easy installation, and long transmission distance.

Unique advantages

1. Comes standard with WiFi and bxsensor app, supporting mobile app to read and display sensor dynamic values;

2. The sensor can be powered on to view data on the mobile phone, which is very convenient;

3. Using BX sensors and bxsensor App greatly facilitates on-site debugging, quick diagnosis, and troubleshooting in complex installation environments, greatly saving costs and improving efficiency;

4. Support online firmware upgrade of programs, greatly saving system maintenance costs. A small number of points can be upgraded to firmware through a mobile app, while cluster points can be upgraded to firmware through a data platform.

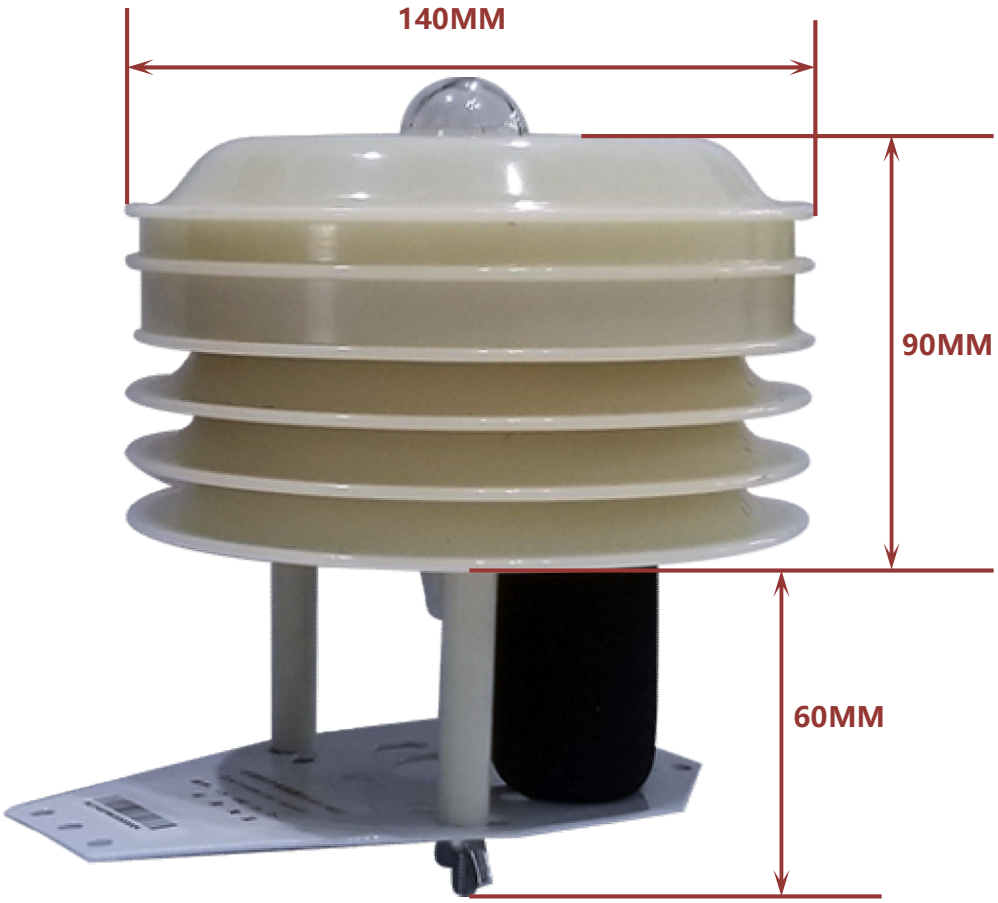
5. Support regular chassis installation and flange chassis installation. The latter is more suitable for the convenient installation of smart light pole projects.

6. Equipped with three anti coating technology as standard, it can adapt to harsh environments, significantly reduce failures, and improve stability;

Currently, 5 products have been upgraded to Rev The C version has the above advantages. Including meteorological integrated sensor BX-QX (7), meteorological integrated sensor BX-QX (4), air quality sensor BX-PM, temperature and humidity sensor BX-WS, and noise sensor BX-ZS.

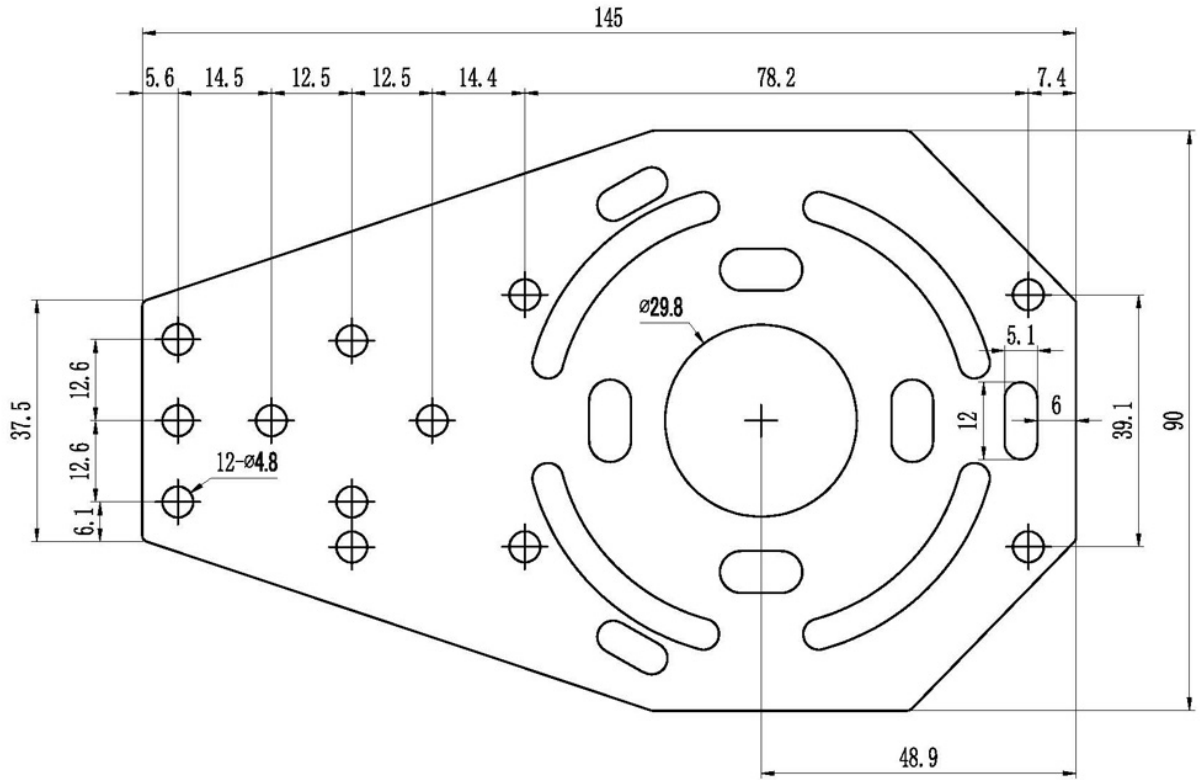
Installation diagram

External dimensions



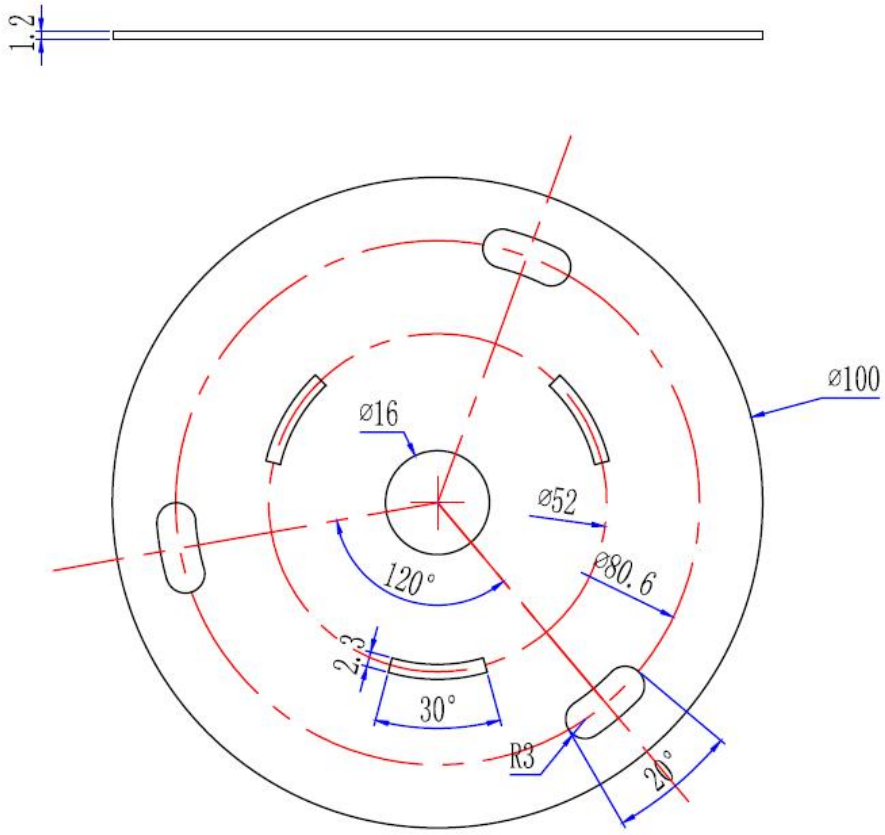
Tray size

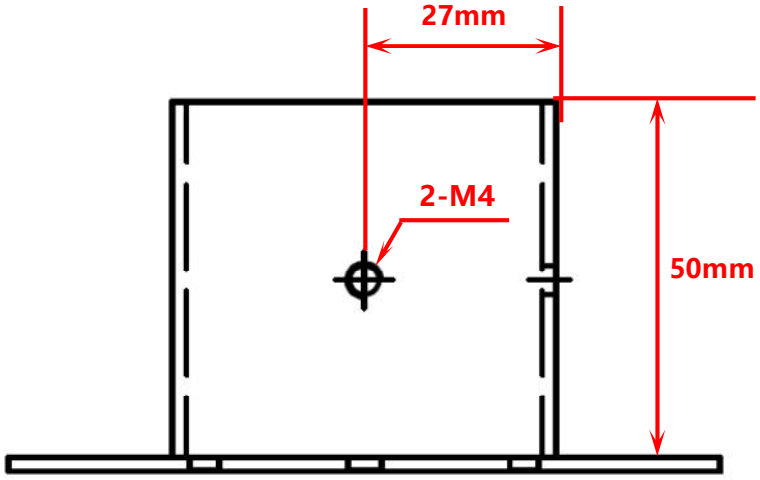
Unit：mm



Flange size

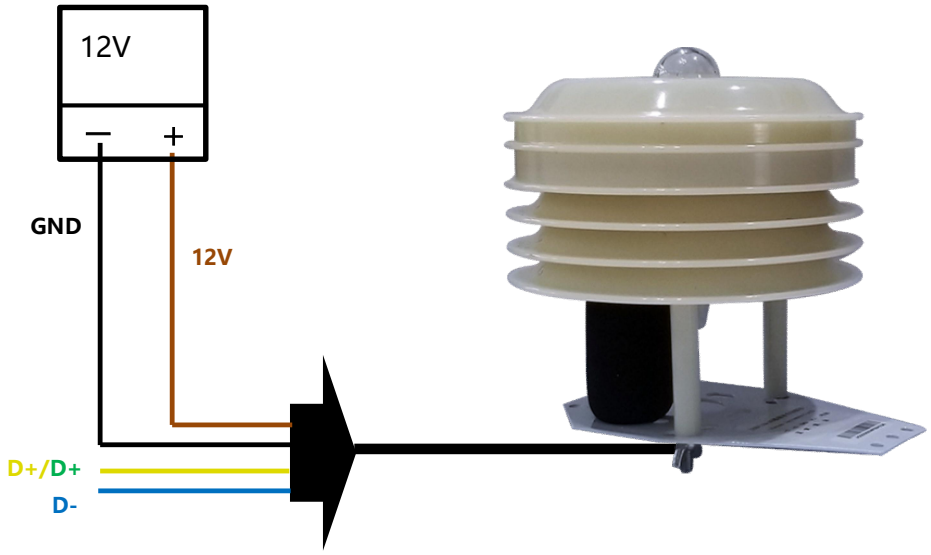
Unit：mm





Definition of Connection Line

The number on the local wiring terminal should correspond to the number on the label on the product body.



Color	Illustration	Remarks
Brown line	12V	Power supply +
Black line	GND	Power supply -
Yellow/Green Line	D+	Receiving signal positive terminal
Blue Line	D-	Receiving signal negative terminal

Technical specifications

DC power supply (default)	DC12V 2A	
Response speed	1s	
Rated power	≤1W	
Output signal	RS485(Modbus protocol)	
Range	temperature	-40℃~+120℃
	humidity	0%RH~99%RH
	noise	30dB~120dB
	PM2.5、PM10	0-1000ug/m³
	TSP	0-1000ug/m³
	atmospheric pressure	0~120Kpa
	illumination	0-65535Lux；0-200 thousand Lux
accuracy	temperature	±0.5℃
	humidity	±3%RH
	noise	±3db
	PM2.5、PM10	±1ug/m³
	TSP	±1ug/m³
	atmospheric pressure	±0.15Kpa@25℃ 75Kpa
	illumination	±7%
sampling interval	temperature	2 seconds
	humidity	2 seconds
	noise	1-2 seconds
	PM2.5、PM10	5 seconds
	TSP	5 seconds
	atmospheric pressure	5 seconds
	brightness	5 seconds
	illumination	5 seconds

Communication protocol

Universal Modbus Protocol

Sensor device model：0x0001

Default sensor device address：0x01

Supported sensor type data:

PM2.5/PM10 index

TSP index

noise index

illumination index

atmospheric pressure index

Temperature and humidity index

Basic communication parameters

Code	8-bit binary
Data bits	8 bit
Parity bit	no
stop bit	1 bit
Error verification	CRC（Redundant cyclic code）
Baud rate	2400bit/s、4800bit/s、9600 bit/s ，default is4800bit/s

Communication protocol format

Adopting Modbus RTU communication protocol, the format is as follows:

The time for the initial structure to be ≥ 4 bytes

Address code = 1 byte

function code = 1 byte

Data area=N bytes

Error check=16 bit CRC code

The time for ending a structure ≥ 4 bytes

Address code: The start address of the transmitter, which is unique in the communication network (factory default 0x01). Function code: The instruction function indication issued by the host.

Data area: The data area contains specific communication data, please note that the high byte of 16 bits data comes first!

CRC code: a two byte check code.

Register: 1 register=2 bytes

Host query frame structure:

Address code	Function code	Register start address	Register start address Low byte	register Length	Low bit of verification code	High bit of verification code
1 byte	1 byte	2 bytes	2 bytes	2 bytes	1 byte	1 byte

Slave response frame structure:

Address code	Function code	Effective byte number	First data area	Second data area	N data area	Check Code
1 byte	1 byte	1 byte	2 bytes	2 bytes	2 bytes	2 bytes

Communication register address description

Register	Register number	Content	Operate	Scope and Definition explain
0x0007	1	PM1.0	read only	actual value, unit ppm
0x0008	1	PM2.5	read only	actual value, unit ppm
0x0009	1	PM10	read only	actual value, unit ppm
0x000A	1	Number of particles (per 0.1 liters of air)	read only	actual value
0x000B	1	Number of particles with a diameter greater than 0.5 μ m (per 0.1 liters of air)	read only	actual value
0x000C	1	Number of particles with a diameter greater than 1.0 μ m (per 0.1 liters of air)	read only	actual value
0x000D	1	Number of particles with a diameter greater than 2.5 μ m (per 0.1 liters of air)	read only	actual value

0x000E	1	Number of particles with a diameter greater than 5.0 μ m (per 0.1 liters of air)	read only	actual value
0x000F	1	Number of particles with a diameter greater than 10.0 μ m (per 0.1 liters of air)	read only	actual value
0x0010	1	noise	read only	actual value， unit db
0x0011	1	illumination	read only	actual value， unit Lux
0x0012	2	Atmosphere pressure	read only	actual value, unit Pa
0x0014	1	Temperature	read only	Expand upload by 10 times， unit ℃
0x0015	1	Humidity	read only	Expand upload by unit %

Example and Explanation of Communication Protocol

For example, inquiring about temperature value: device address is 0x10

Address code	function code	start address	data length	Low bit of verification code	High bit of verification code
0x10	0x03	0x00 0x14	0x00 0x01	0xC7	0x4F

Response frame (e.g. reading temperature of -10.1 ℃ and humidity of 65.8% RH)

Address code	function code	Effective byte number	Temperature value	Low bit of verification code	High bit of verification code
0x10	0x03	0x02	0xFF 0x9B	0x44	0x1C

Temperature: When the temperature is below 0 ℃, upload it in the form of a supplementary code

0xFF9B (hexadecimal)= -101 => Temperature = -10.1℃

For example, inquiring about the continuous register from illumination to humidity: device address is 0x10

Address code	Function code	Start address	Data length	Low bit of verification code	High bit of verification code
0x10	0x03	0x00 0x11	0x00 0x05	0xD6	0x8D

Response frame (e.g. reading temperature of -10.1 ℃ and humidity of 65.8% RH)

Address code	Function code	Effective byte number	Illumination	Atmospheric pressure value	Temperature value	Humidity value	Low bit of verification code	High bit of verification code
0x10	0x03	0x0A	0x00 0x97	0x00 0x01 0x90 0x74	0x00 0xDB	0x02 0x8E	0x44	0x1C

illumination：0x0097 = 151 Lux

atmospheric pressure ： 0x019074 = 102516 Pa ~= 102.5 Ka

Temperature ： 0x00DB = 219 > 21.9 ℃

Humidity ： 0x028E = 654 > 65.4%