Shenzhen Vkinging Electronics Co., Ltd

Vk20x DC static charge amplifier

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——Precision Precision Reliability

Introduction:

Vk20x is a high-precision DC charge amplifier. This product adopts high-precision charge conversion unit, low-noise amplification unit, optimized power supply of low-noise power supply, etc., so that this product has the advantages of high precision, ultra-low noise, high suppression ratio, wide measurement range and low-temperature drift. It is suitable for various occasions of precision charge measurement.

The vk20x charge amplifier adopts all metal shielding and the internal core unit is shielded separately again to isolate interference in the largest scale. The power supply unit adopts the design of wide input range and high reliability. This product can be used in occasions with strong industrial interference, and has the advantages of moisture-proof and shockproof.

characteristic:

- **High precision, low noise and small frequency response error**
- **It adopts precision devices with high stability**
- **Metal shielding shell, strong anti-interference ability**
- **Adjustable gain, four gain settings**
- **Extremely wide voltage input range**
- **Press X10 times optional input range**
- **BNC input and output, which can be easily connected to various instruments**

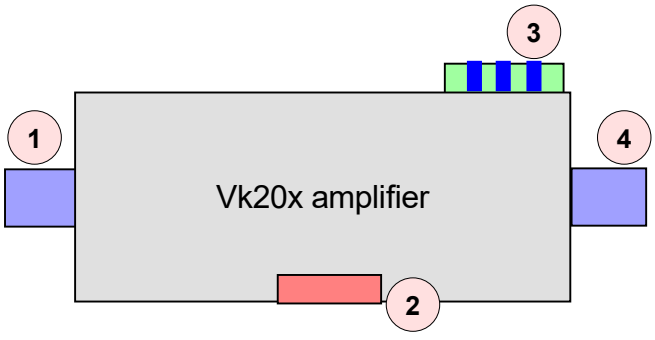
Application:

- DC charge detection
- Measurement of piezoelectric effect and photoelectric effect
- Application of quartz load cell
- Electrostatic detection

Basic parameters

Charge input range	VK205: 0 ~± 2200,000pC VK204: 0 ~± 220,000pC VK203: 0 ~± 22,000pC VK202: 0 ~± 2,200pC
Supply voltage	DC 8~24V
Frequency response	DC~10kHz
Measurement accuracy	<1%
Input impedance	>1TΩ
Residual noise	<1mV

Diagram of port



1. **Charge input**
2. **Gain switch**
3. **Power & reset**
4. **Signal output**

CON	GND	VCC
Reset	Gruond	Power

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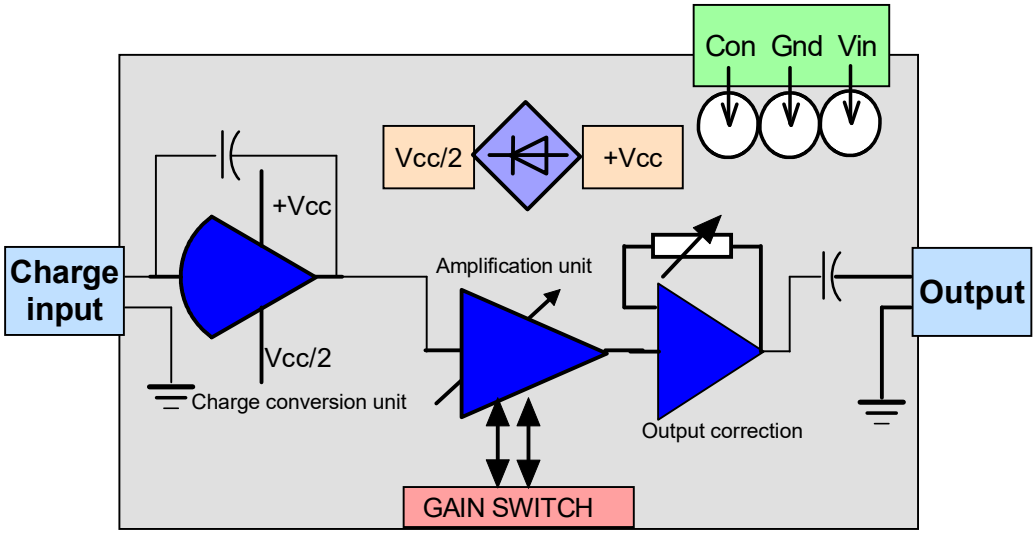
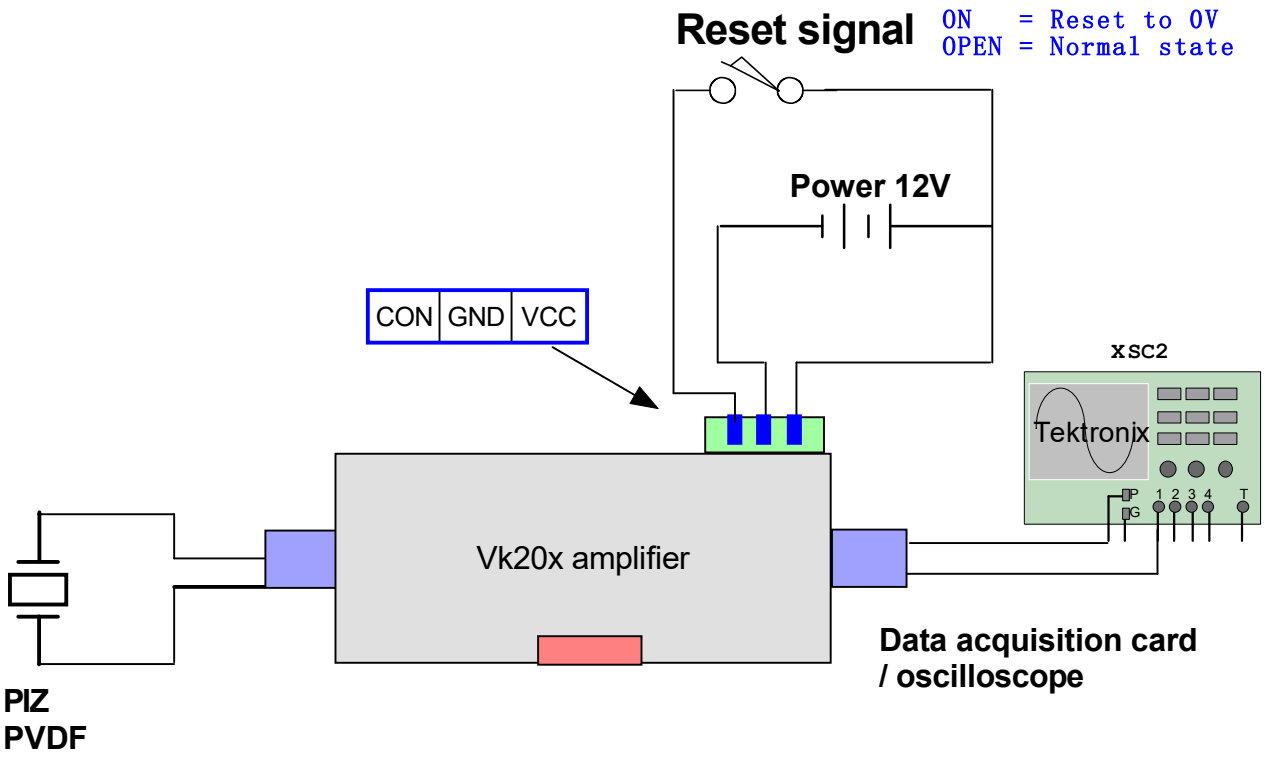
System block diagram



Typical wiring application diagram



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Comprehensive electrical parameters

Item	Unit	Typical	Range
Supply voltage	V	8~24	3~30
Supply current	mA	15	8~25
Input mode		BNC single-ended input	
Input charge range		VK205: ± 2200,000pC VK204: ± 220,000pC VK203: ± 22,000pC VK202: ± 2,200pC VK201: ± 220pC	
Input charge frequency response range		DC~10kHz	
Input impedance	Ω	1T	
Reset control voltage	V	3	1~VCC
Reset control current	mA	5	1~10
Reliable reset time	s	2	1~3
Output mode		BNC single ended output	
Output impedance	Ω	75	
Output voltage range	V	-5.5 ~ +5.5V	
Output bias voltage	mV	<0.1	
Dial switch gain accuracy		<1%	
Toggle switch gain range		1 ~ 101 times	
Operating temperature:	Centigrade		-40~ 85
Storage temperature	Centigrade		-60~ 105

Absolute maximum value for safe use

Item	Unit	Value	
Supply voltage	V	-1 ~ +35	***If the absolute maximum value is exceeded, the device may be damaged and irreparable damage may be caused**
Charge input port	V	+-2000 (with internal protection circuit)	
Output port	V	-1 ~ + 35V (internal protection circuit)	
All ports electrostatic input (ESD)	V	4000	

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TEL： (+86) 0755-36932986
www.vkinging.com

Gain switching selection

The charge amplifier is provided with a charge conversion stage and a voltage amplification stage, but when the charge output conversion output voltage is small, the amplification gain can be used for re amplification

Shift switch corresponding secondary gain

Vk20x-c / - D type

GAIN	DIP SWITCH 1	DIP SWITCH 2	DIP SWITCH 3	DIP SWITCH 4
1	ON	OFF	OFF	OFF
2	OFF	ON	OFF	OFF
10	OFF	OFF	ON	OFF
25	OFF	OFF	OFF	ON
101	OFF	OFF	OFF	OFF

Dial position1
Dial position2
Dial position3
Dial position4

Charge vs voltage output

The charge conversion sensitivity AC is:

Type VK201: input range 0 ~ ± 220pc, sensitivity AC = 10pc / 100mV
Type VK202: input range 0 ~ ± 2200pc, sensitivity AC = 100pc / 100mV
Type VK203: input range 0 ~ ± 22000pc, sensitivity AC = 1000pc / 100mV
Type VK204: input range 0 ~ ± 220000pc, sensitivity AC = 10000pc / 100mV
Type VK205: input range 0 ~ ± 2200000pc, sensitivity AC = 100000pc / 100mV

Then the charge CIN is equal to the output voltage Vout times the sensitivity AC

Cin = Vout * Ac

If the gain is set, the gain gain must be calculated. The value of the charge conversion stage is the output voltage divided by the gain

$$Cin = \frac{Vout \cdot Ac}{Gain}$$

CIN: amount of charge
AC: charge conversion sensitivity
Gain: set magnification
Vout: amplifier output voltage value

Taking vk203 as an example, if the output is measured to 800mv, the amplifier sensitivity AC = 1000pc / 100mV, gain = 2, the chargeThe amount is 4000pc

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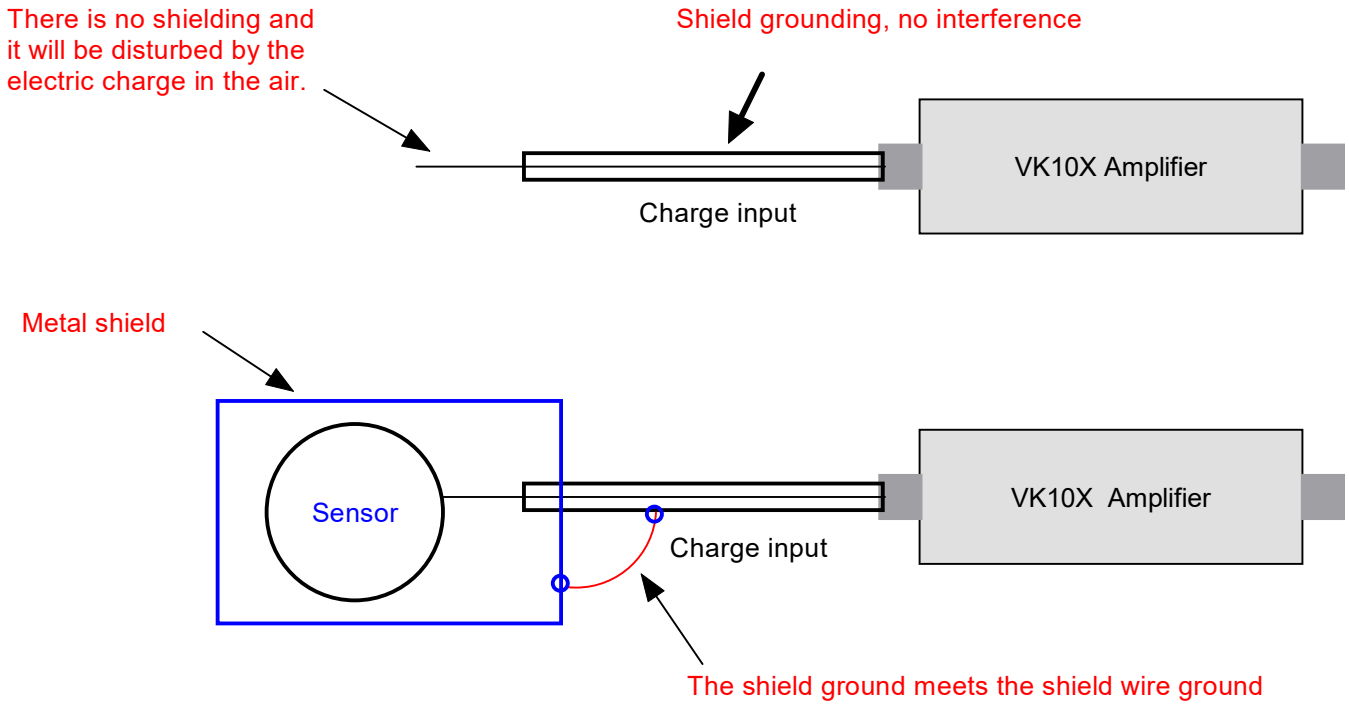
Notes for use

Charge input processing

The input of the charge amplifier is the charge signal, and the unit is coulomb(C), 1 Coulomb(C) = 1,000,000 Micro coulomb(uC)

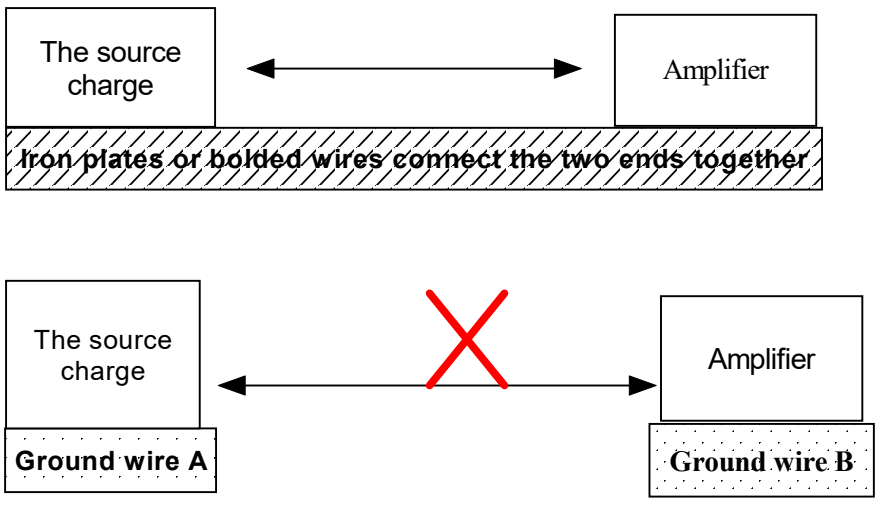
1 uC = 1000 nC = 1,000,000 pC

Charge for limited unit electronic components of the weak signal, so extremely vulnerable to air humidity, temperature and the influence of space charge distribution in. Especially when there are strong electric field in the space, electric conduction through the air charge to charge input resulting in interference. So charge input shielding input wire or the input source device as far as possible, try to avoid input directly exposed to the air.



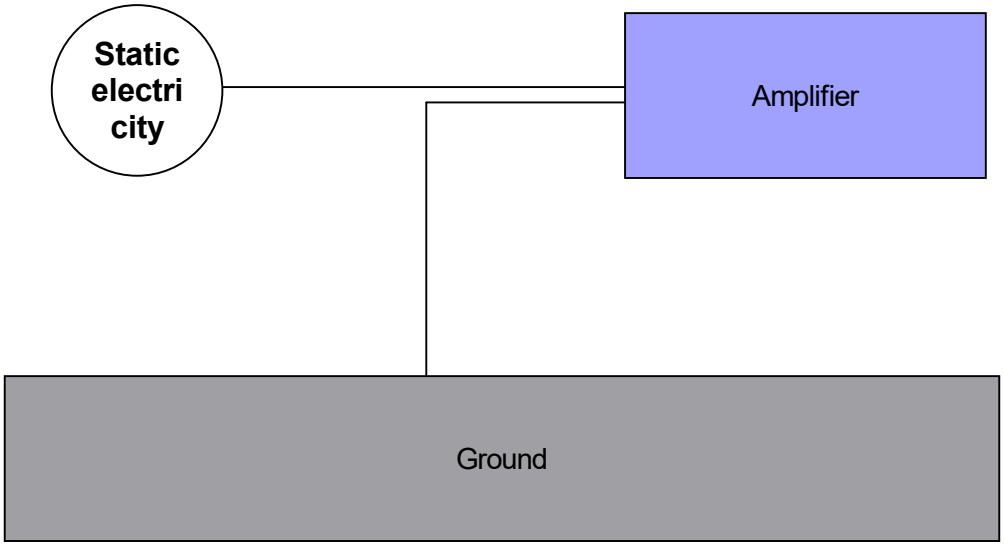
Reference processing of charge input

If be measured between charge and charge amplifier, if the ground plane is not very strong, there will be a weak electric potential difference. In charge measurements, weak electric potential difference will lead to the output of the strong interference. So if the measurement between the source and amplifier or far altogether to poor circumstances, try to improve the total conditions in order to achieve good results.



Measurement of static electricity

For the measurement of space static electricity, one end of the amplifier needs to be connected to the earth The reference ground can be a metal table or an object with a large air / ground contact surface.



Overall dimension drawing