Shenzhen Vkinging Electronics Co., Ltd

Reference Charge Generator CHA10x

Reference charge signal generator-CHA10X
——Precise Accurate Fast Reliable

Introduction:

Cha10x is a high-precision charge signal generator, which has the advantages of high resolution, high precision, ultra-low noise, wide adjustment range and low-temperature drift. It is suitable for various charge signal occasions such as accurate charge drive, charge amplifier correction and charge comparison.

Cha10x generator is composed of FPGA high-speed processor and high-precision charge generation unitThe source adopts high-precision reference, the charge unit adopts high-precision imported charge devices, and the charge range and frequency are accurately controllable.

Cha10x generator adopts all metal shielding, which can be used in occasions with strong industrial interference, and has the advantages of moisture-proof, shockproof and anti-interference.

Features:

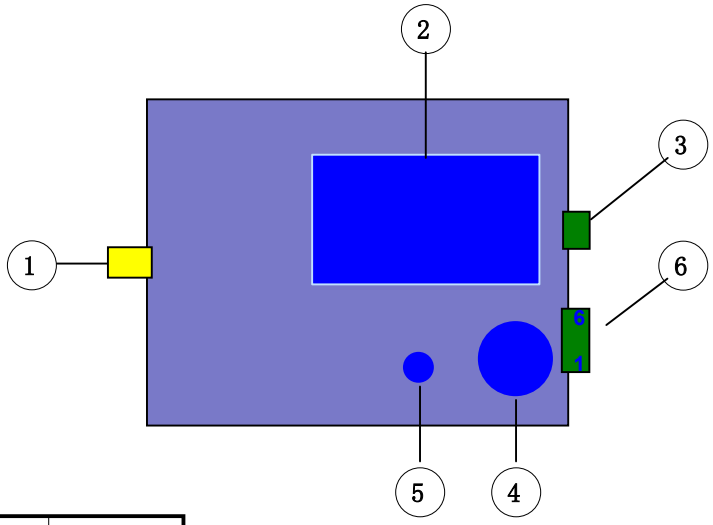
- **High-precision** : 0.5% Absolute accuracy @1kHz
- **Adjustable charge range** : 1pC----580,000pC
- **Frequency adjustable** : 1Hz ~10kHz
- **Programmable adjustable** : USB/485 bus
- **Mode switching** : Sine / square wave output
- **Digtal dispaly** : OLED dispaly，Intuitively adjust parameters

Application:

- Charge device calibration
- Charge signal source
- Charge driven

Interface and component diagram

1. Charge output
2. LCD
3. USB
4. Adjustment knob
5. function keys
6. RS485 bus and power supply terminal



1	2	3	4	5	6
A	B	GND	GND	GND	VCC

*USB or terminal power supply

Application description

The charge value set by the charge generator is the peak value generated by the charge. For example, as shown in the figure below, when it is set to 400pc, the output is the charge output of - 200 ~ + 200pc.

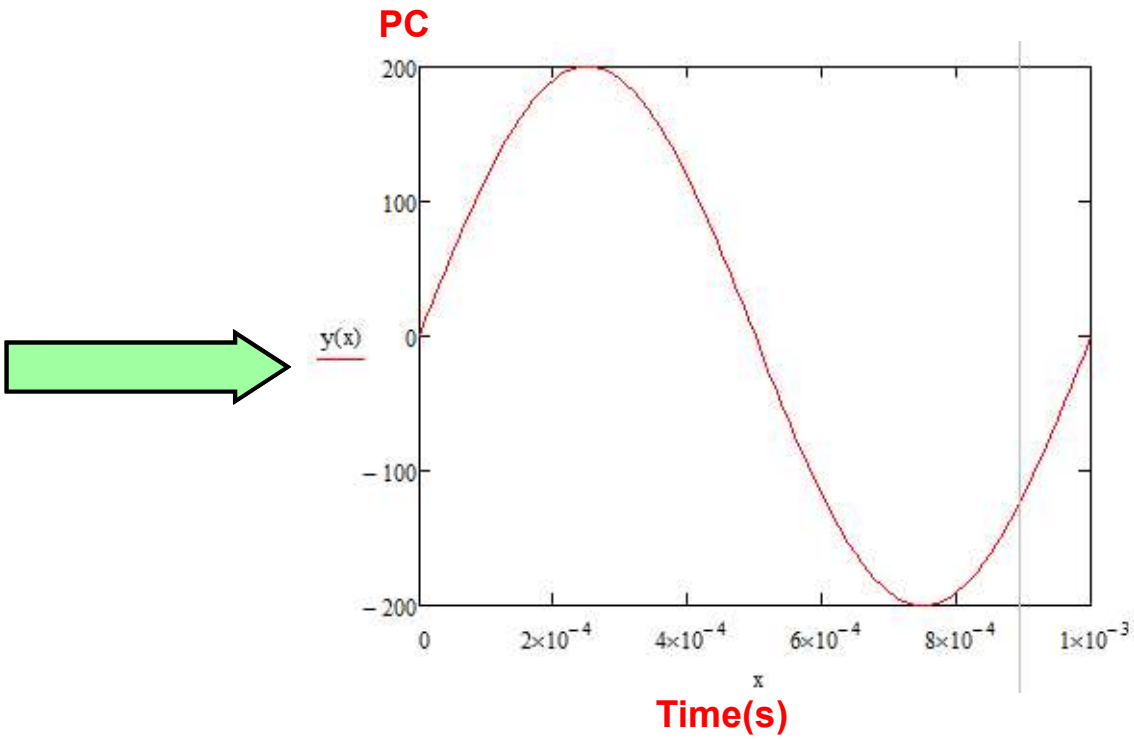
Below are the input and output functions

Corresponding mathematical formula

$$Cout := PC \sin\left(\frac{x}{Freq} \cdot 360000 \cdot deg\right)$$

PC: Set charge value
Freq: Set frequency value
Cout：Output charge waveform value

Charge generator
400PC
1kHz
SIN



CHA10X Charge signal generator

Electrical parameters

Item	Unit	Typical	Range
Supply voltage	V	5	
Supply current	mA	280mA@5V	
Power	W	1.3W	
Charge output range		1pC - 580nC	*1nC=1000pC
Charge manual adjustable range		1pC setp @1~50pC 10pC setp @50~1000pC 1nC setp @1~50nC 10nC setp @50~600nC	*When the knob is pressed, it is 5 times the speed adjustment *1nC=1000pC
Output charge accuracy		1~75pC @>1% 75pC~600nC @>0.5%	
Frequency manual adjustable range		1Hz setp @1~50Hz 10Hz setp @50~100Hz 100Hz setp@100~10KHz	*When the knob is pressed, it is 5 times the speed adjustment
RS485 Bus baud rate	BPS	9600(default)	300-115200 adjustable
RS485 Bus level		5V TTL	
Frequency accuracy		>0.1%	
Static impedance of charge output	GΩ	100	50~1000
Antistatic capability of output port		4KV	
Working temperature	Centigrade		-20~ 85
Storage temperature	Centigrade		-40~ 105
Physical dimensions (L, W, H)	mm	120*108*26	Excluding connector length

Precautions for use - 1

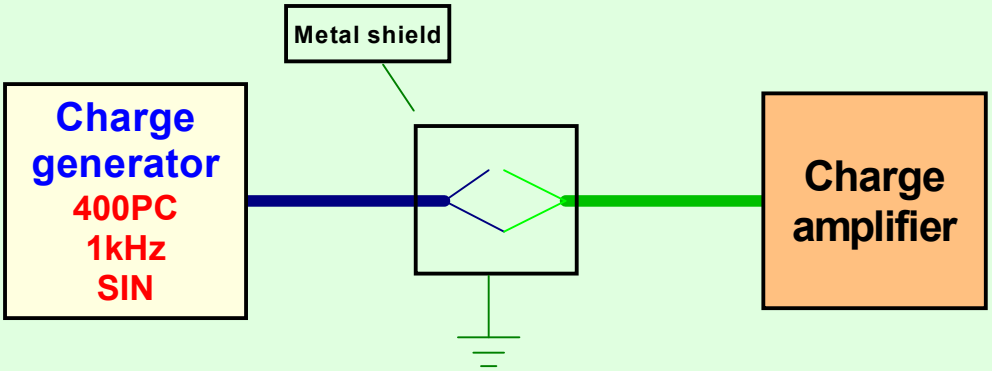
The generated signal is a charge signal, and the voltage range is limited to 12V, which is a safe range. The charge signal is a very weak current signal, and the power and current are very small, so the output charge signal is easy to be affected by the environment and affect the measurement results. When using, pay attention to strengthening the shielding measures

Common questions are:

1. Output conductor leakage
2. The output signal is leaked by air humidity
3. The output signal is interfered by air coupling of 110V/220V AC in space

Treatment methods include:

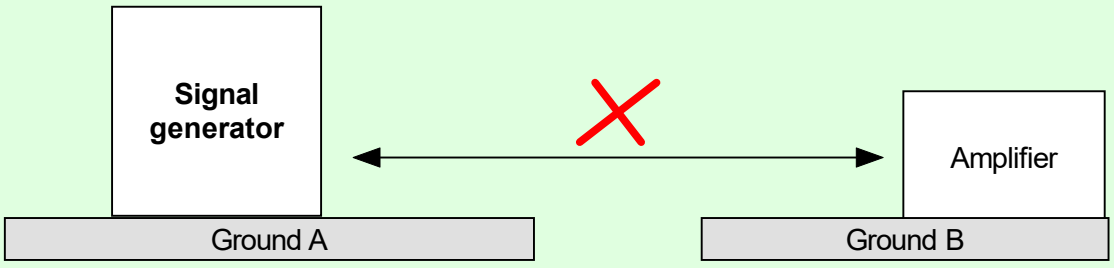
1. Adopt low leakage high-quality conductor (such as Teflon conductor)
2. The conductor adopts shielded conductor (coaxial shielded wire)
3. The conductive part of the charge connection must be shielded



Shielding treatment at connection

Reference ground signal processing

If there is not a solid ground between the signal source and the amplifier, there will be a weak potential difference In measurement, weak potential difference will lead to strong output interference Therefore, if the measurement source is far from the amplifier or the common ground is poor, it can be improved by the following methods:

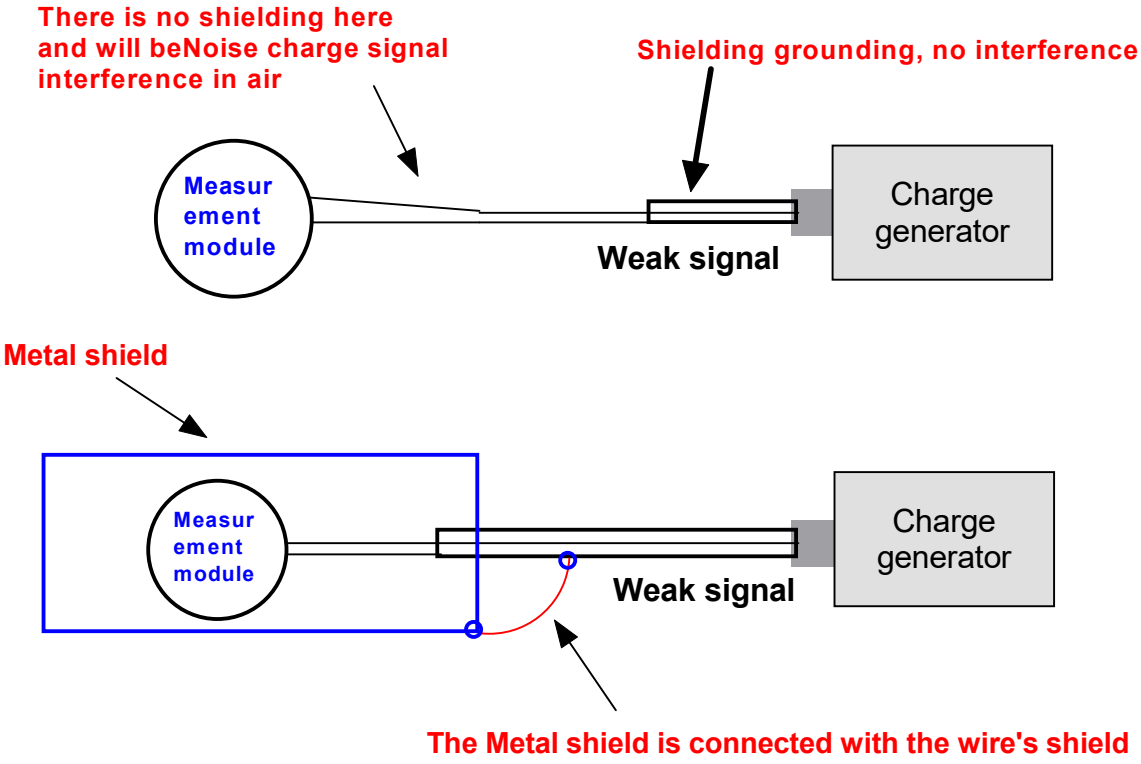


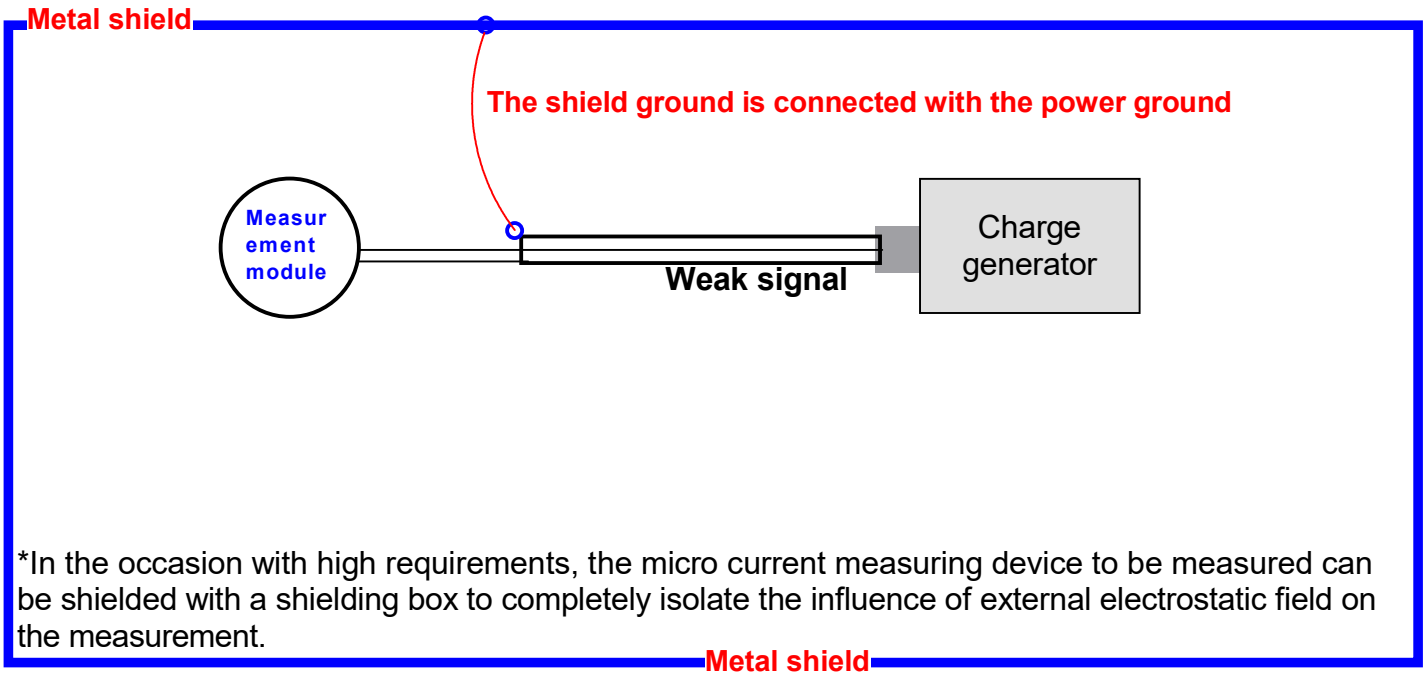
Method 1: connect the ground wire with reinforcement.
Method 2: the signal generator is powered by an isolation adapter so that the ground wire of the signal generator is suspended and does not form a leakage circuit The isolation voltage (leakage resistance) depends on the isolation voltage (leakage resistance) of the adapter.
Method 3: if the signal generator is powered by battery (power consumption 1.3W), the ground wire of the signal generator is completely suspended and does not form any leakage circuit This method is recommended under extremely high requirements.
Method 4: put the signal generator and the measured object into the same shielding box for measurement And connect the ground wire of the generator or the measured object to the ground wire of the shielding box.

Precautions for use - 2

Input processing

Weak signals are easily affected by coupled signals transmitted from other signal sources Especially when there is a strong electric field in space, the electric field will be transmitted to the input in the form of charge through air, resulting in interference Therefore, the input terminal shall shield the input wire or input source device as much as possible to avoid direct exposure of the input to the air





*In the occasion with high requirements, the micro current measuring device to be measured can be shielded with a shielding box to completely isolate the influence of external electrostatic field on the measurement.

Precautions for use - 3

Selection and Connection of Charge Transfer Wires

If there is a loss medium in the transmission process of weak charge signal, it will leak or even consume the charge In reality, some common methods and common wires cannot be used in electric charge situations, such as winding electrical tape around the wiring. The tape can be used in conventional electricity without problems, but the charge will leak due to the glue on it Especially in low frequency applications, the insulation coefficient of materials should be as high as possible, and the high frequency charge signal is less sensitive to leakage with frequencyWe recommend Teflon (Teflon) as the charge transmission conductor:[Performance characteristics of Teflon wire]

1. It has excellent electrical insulation performance, high voltage resistance, low high-frequency loss, no moisture absorption, and high insulation resistance.

2. It has excellent corrosion resistance, almost insoluble in any organic solvent, and can resist oil, strong acid, strong alkali, strong oxidant, etc.

3. It has excellent flame resistance, aging resistance and long service life.

Disadvantages: the wire is hard

Our supporting is standard RG316 (single-layer shielding)/RG316D (double-layer shielding) conductor Shielding and insulation are guaranteed at the same time

The second option: high-voltage shielded silicone wire
The advantages are the same as Teflon line, and it is soft

Shielded type **Unshielded**

Physical object and size

Our company reserves the right to modify the function and appearance of the final physical object without notice.