



Operating Instructions

Vibrating Wire Earth Pressure Gauge

Weihai Gemho Digital Mining Technology Co., Ltd.

A pressure gauge (earth pressure gauge) is a surface/buried pressure sensor (as shown in Figure 1-1), which is mainly used to measure structures such as earth-rock dams, earth lifts, slopes, roadbeds, retaining walls and tunnels. The stress on the surface/internal soil is suitable for long-term automatic monitoring. The main components of the sensor are made of special steel, which can be used in harsh environments. Its performance is excellent, with good accuracy and sensitivity, excellent waterproof performance, corrosion resistance and long-term stability. After perfecting the cable protection measures, it can be directly buried in the compacted soil with high requirements for the instrument.

A single pressure gauge can generally only measure the positive pressure perpendicular to its surface. 3 to 4 pressure gauges are buried in groups and form a certain angle with each other. The large and small principal stress and the maximum principal stress at the observation point can be obtained according to the stress state theory. shear stress.



Figure 1-1

How the product works

The vibrating wire pressure gauge is mainly composed of a pressure-bearing membrane, a sealing cover, an induction coil, and a high-strength steel wire. During use, the change of pressure on the structure causes the deformation of the pressure-bearing membrane. This small amount of deformation can change the tension of the steel string and affect the oscillation frequency of the steel string. The change of the pressure on the pressure-bearing membrane can be converted by measuring the change of the oscillation frequency.

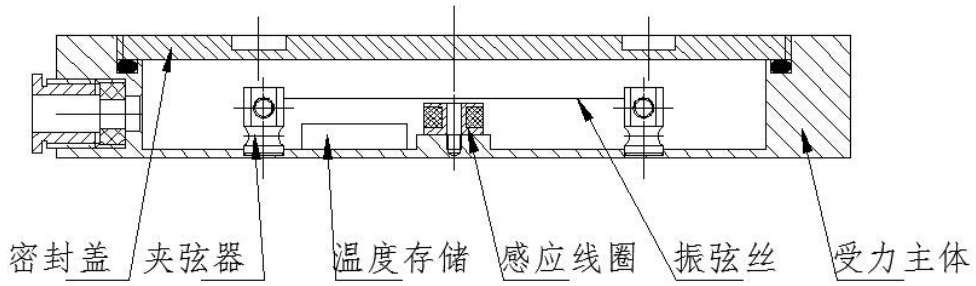


Figure 2-1 The internal structure of the pressure gauge

Main Specifications

SPEC	Range (MPa)	0.2	0.4	0.6	0.8	1.0	2.0	3.0
	Resolution(F-S)	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
	Operating temperature (°C)	-20~70	-20~70	-20~70	-20~70	-20~70	-20~70	-20~70
	Temperature measurement accuracy (°C)	±0.5	±0.5	±0.5	±0.5	±0.5	±0.5	±0.5

Note: Size and performance parameters are conventional product parameters, other parameters can be customized according to demand.

Product performance characteristics

1. Imported steel strings are used, with stable temperature performance and long service life;
2. Built-in intelligent temperature sensor, which is convenient for temperature compensation and improves the accuracy and reliability of monitoring data;
3. The main components are all treated with special surface treatment, which is suitable for use in harsh environments;
4. With good precision and sensitivity, excellent waterproof and corrosion resistance.

Product Instructions

(1) Line sequence description

The pressure gauge uses a two-core shielded cable or, if equipped with a temperature sensor, a four-core shielded cable.

Sensor Cable Color	Green	White	Red	Black
Line order definition	temperature +	temperature-	frequency	frequency

Wiring preprocessing

The wiring is shown in Figure 5-1 below, peel off the outer insulation layer of the connector, and the four-core wires differ by 1cm in order of length, and strip off the wire ends.

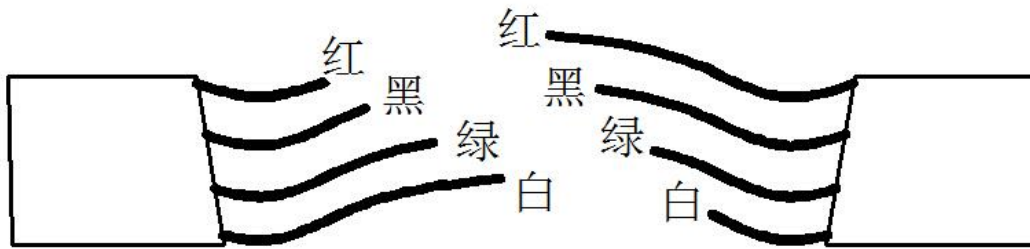


Figure 5-1

Handling of unstable temperature signals

When the temperature signal is unstable on site, the shielded wire exposed at any terminal can be connected to the negative temperature terminal. The specific connection method is shown in Figure 5-2.

Note: This method is only suitable for use when the temperature data is abnormal, no need to change under normal circumstances.

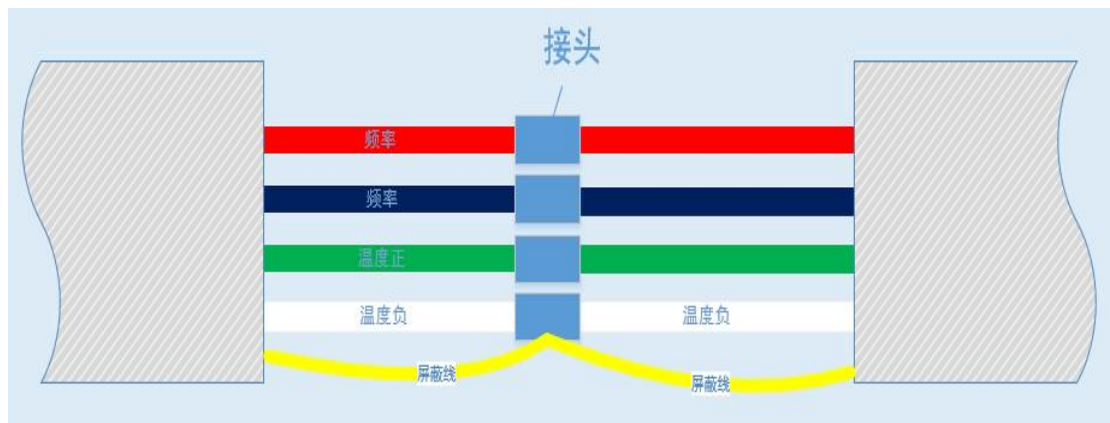


Figure 5-2

Data processing

Calculation formula of compressive stress P of vibrating wire pressure gauge:

P: compressive stress value measured by vibrating wire pressure gauge, MPa;

K: The linear relationship coefficient between the frequency value output by the vibrating wire pressure gauge and the compressive stress, also known as the sensitivity coefficient of the vibrating wire pressure gauge, has been calibrated at the factory, unit: MPa/Hz² ;

: frequency value of vibrating wire pressure gauge at time i, Hz;

: The base frequency value of the vibrating wire pressure gauge in the initial state, Hz.

: The relationship coefficient between the compressive stress and temperature of the vibrating wire pressure gauge, which has been calibrated at the factory, unit: MPa/°C;

Ti: the temperature at the time of detection, which is the temperature at the time of measurement, ° C;

: The temperature at the time of factory inspection and calibration, that is, the temperature at the time of measurement, °C.

Product main accessories

6-1 Product supporting list

Item	Description	Qty	Remark
1	Product certification	1	
2	User's manual	1	

Precautions for use

1. Because this product is a precision instrument, you should avoid falling and other phenomena. If the product cannot be used due to severe falls, please contact the after-sales service department of our company, and do not disassemble the machine by yourself.
2. Because the product needs to be installed on site, it may be affected by harsh environments. It should be installed in an environment protected from rain and

lightning as much as possible to avoid equipment damage due to lightning strikes. If necessary, the product integration environment should be grounded to lead the lightning strike current to the ground to protect the equipment.

3. Before you use this product, please read the relevant information provided in this guide carefully. When accepting the product, please check whether the certificate, manual and other information are complete.
4. After unpacking, the instrument should be stored in a dry, ventilated and non-corrosive place. It should be handled with care and avoid violent vibration. Dust, humidity, and severe temperature changes can affect the life of this product, so avoid placing it in these places.
5. If the instrument is faulty or damaged to varying degrees, please do not try to repair it by yourself, you should contact the company's after-sales personnel for repair, and do not open the device by yourself.

Reliability Limits and Warranty Period Coverage

Weihai Gemho Digital Mining Technology Co., Ltd. is responsible for implementing free warranty for faults or defects caused by quality reasons. The scope of the warranty is the electrical components in the whole machine. Consumable or fragile components such as communication cables, aerial plug cables, and power adapters are not covered by the warranty.

When one of the following situations occurs, this product does not implement free warranty, and is responsible for maintenance and charges as appropriate:

1. beyond the warranty period;
2. Normal wear or consumption;
3. Damages caused by failure to use, maintain, or improperly maintain or store in accordance with the requirements of the product instructions for use;
4. Unauthorized maintenance or self-maintenance;
5. Damage caused by force majeure;

6. Damaged due to human reasons.

7. Free one-year warranty for quality problems such as electrical faults caused by non-human damage.

For the power supply requirements of the external sensors and equipment of the product, please refer to the description of the product technical specification table.

Weihai Jinghe Digital Mining Technology Co., Ltd. does not guarantee that the equipment can work normally in environments or conditions other than these conditions or the performance parameters are lower than the technical specification table.

We reserve the right to modify the instruction manual and change the product design at any time without notifying the user.