

SCA1000

Buried cable manual temperature



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Overview

Ground source heat pump systems use the soil as a buried pipe heat exchanger heat source or heat sink, heating and cooling of buildings. In the buried pipe heat exchanger design, thermal conductivity of the soil is very important parameter. The long-term reliability of the ground temperature monitoring is especially important. Thermal conductivity measured in the field when the soil long enough time to test, test, stable conditions when the fluid temperature at different depths import, export and may affect the accuracy of test results. Therefore, the design of buried cable temperature is especially key. Temperature than the traditional method of cable design, SCA1000 Thermocouple for easy wiring, high precision and without environmental impact, cost advantages, has been widely used in pipe and ground source geothermal heat pump system monitoring, because of reliability and stability in a number of projects have been verified and have achieved good beer.

To facilitate the study of soil, water wells and other environmental heat for air conditioning energy efficiency of reliable research or temperature measurement, temperature measurement is currently SCA1000 ground heat exchanger buried cable for the wells, a small diameter, depth, and so deep, the traditional temperature measurement mode, if the measured 200 meters underground wells, as illustrated structure, to put a line of 20 20 .20 PT100 sensors with each, if the average place, that put a 10-meter probe cable is required at least 2000 meters, in the Inoue need to configure a detection apparatus at least 20 channels, the temperature For real-time access to computer records, the logging devices have RS232 or RS485 function, according to the above cost estimates, temperature geothermal wells cost at least 10,000 yuan . Although the selection can improve the accuracy of the PT100 temperature measurement accuracy of the system, but the analog data acquisition, provide an effective means of precision instruments is to provide the number of bits AD converter, which provides precision inspection instrument, even if the control 10000 element of the device, if that temperature conditions in the long-distance multi-point temperature measurement, the precision of 0.5 degrees can do, it is very capacity. In response to this demand, search Bo launched "SCA1000 temperature Buried Cable" and the corresponding system.

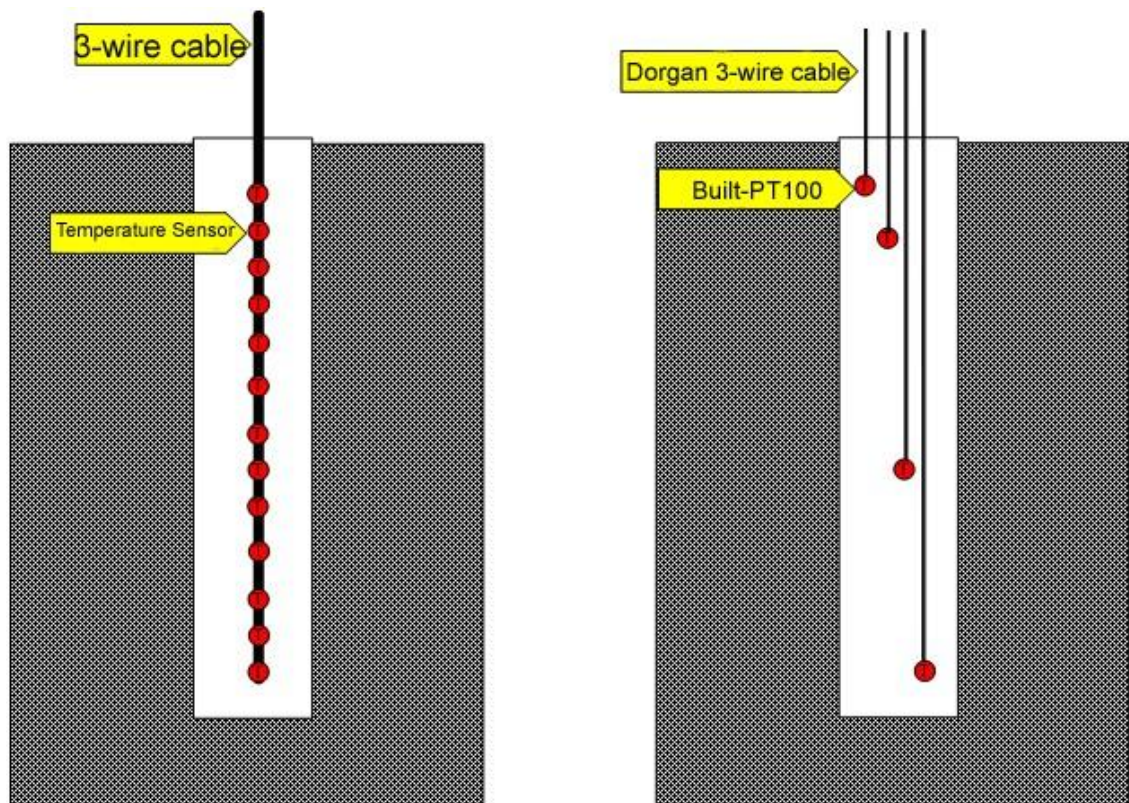
Comparison with the traditional Thermocouple

The temperature detection to the traditional thermistor, PT100 or PT1000 as a temperature-sensitive components, because it is analog to temperature for the collection, For high precision, you need to select the 12 or more AD conversion and signal processing circuit, nearly distance, accuracy and reliability is not affected by the environment, but more than 30 m from the transmission, should adopt the three-wire measurement method, and the need to correct the temperature regularly. When multi-point acquisition, the need to place a cable for each measuring point, as a result of resistance and between analog interference, the temperature measurement accuracy, the system's accuracy, and time will be affected by the impact of the environment than large. Sensors in the work process modules are based on analog signals in the

form, and test environment there is often electric, magnetic and other uncertainties, these factors will have a greater interference signals, thus affecting the measurement accuracy and the actual sensor stability of the system, each needs to be calibrated, so their use is very limited

SCA1000 built-in digital temperature sensor bus, the bus digital temperature sensor chips using temperature as the sensing element, sensing element in the sensor head, sensor accuracy and stability depends on the characteristics of U.S. imports and precision temperature measurement chip level, without the need correction, due to data transfer mode by bus, the bus cable or the sensor can be done very small diameter, maximum diameter of not more than 16mm, and the line length does not have any impact on the sensor accuracy. This is the traditional thermal resistance temperature measurement system can not match advantage. So SCA1000 Bus temperature cable is ideal for deep or the ground temperature monitoring equipment.

SCA1000 sensor built-in data bus comes with its own 12-bit high-precision data converters and field bus manager, directly to the temperature data into a digital signal suitable for long-distance transmission, and each sensor has its own CD identification ID, Therefore, many sensors can be mounted directly on the bus, enabling a single cable detection function of many temperature points.



Contrast wiring

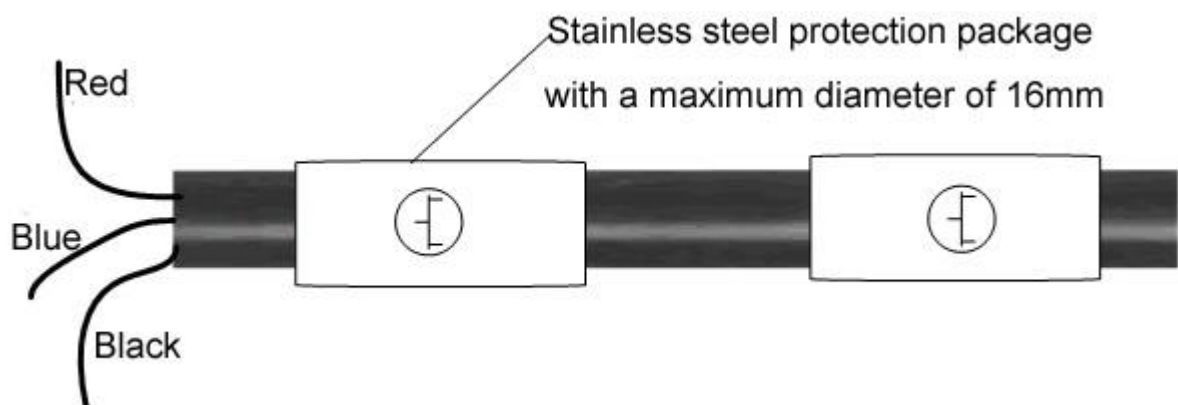
Technical parameters

Model	SCA1000
Display resolution	0.1 or 0.01, determined by the detection module
Temperature rate	750ms
Number of built-in temperature sensor	1-10 only (can be customized according to user needs sensor location)
Power supply	DC 3-5.5V
Power Consumption	1-50mW
Weight	Determined by the cable length
Storage temperature	-20 ~ 80℃
Operating environment:	0℃ ~ +85℃
Support the bus length	1-500m

Features

1. Line of sealed, waterproof anti-corrosion, long life, long-term work in more than 100 meters underwater
2. Can be customized according to user needs sensor location.
3. Each sensor has a unique identification code and number for easy identification
4. Accurate, up to 0.2 degrees (range 10-40 degrees), and the communication distance is not affected
5. Calibration-free, long-term accuracy can be maintained

Cable structure



Cable structure as shown above, the cable for the three core cable, built a number of temperature sensors, the maximum outer diameter of 16mm, the cable

diameter of 8mm, and built-in anti drawstring.

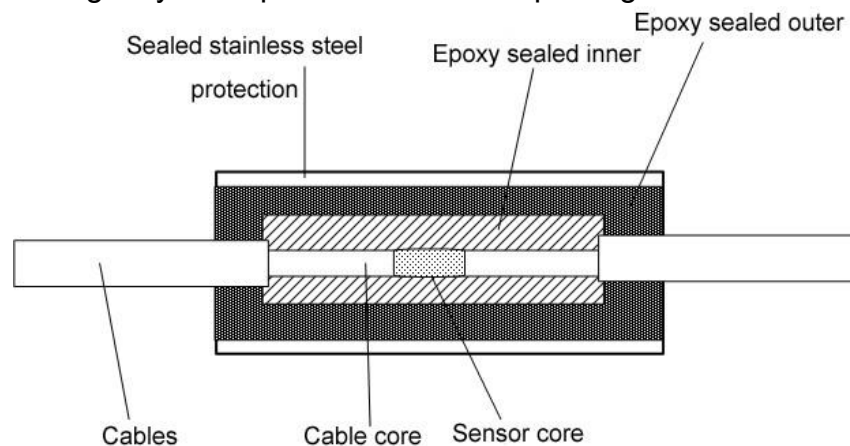
Temperature cable has a three-lead connection for users, three lines of color and for the following:

Red Line - the positive power line, then 3-5V power supply is

Blue line - signal line

Black wire - connected to the supply negative

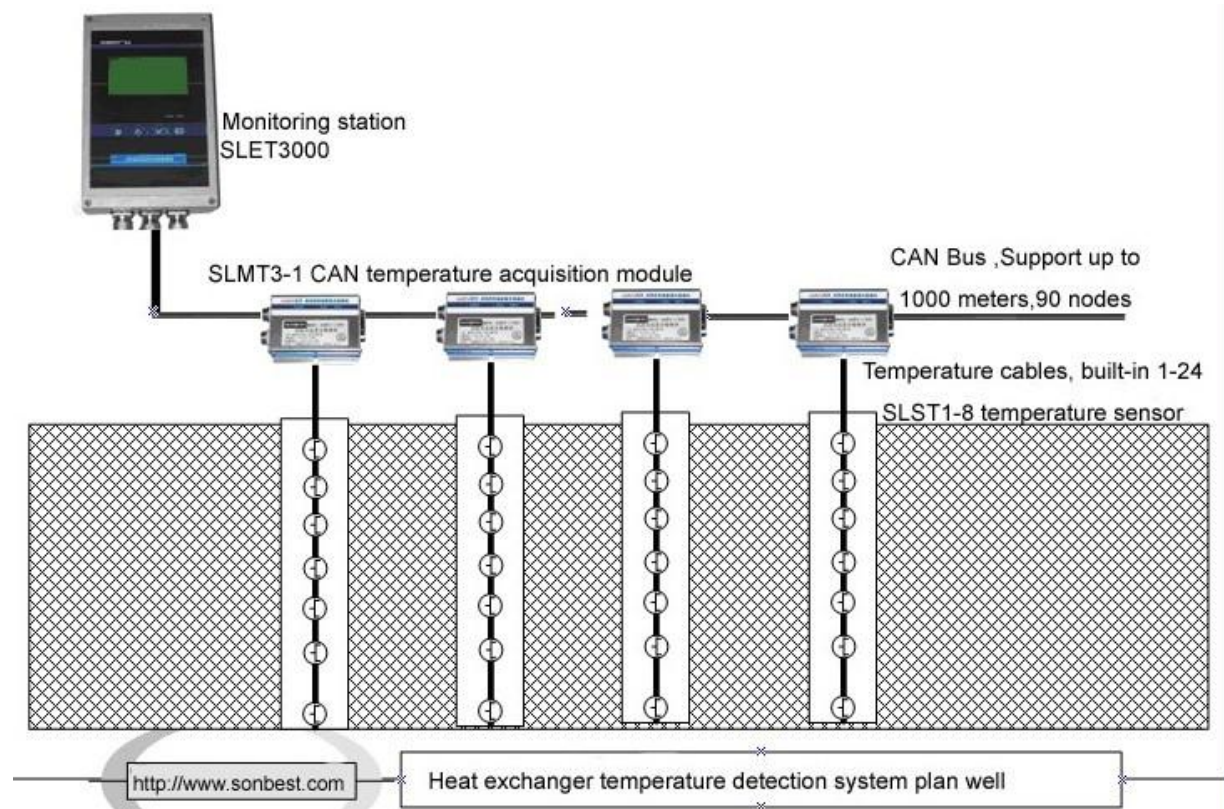
Long-term to work in the water depth below 100, temperature sensor cable through layers of protection for each package.



As shown above, SCA1000 sealed with three layers of waterproof protection process, the outermost layer of stainless steel casing to protect and seal.

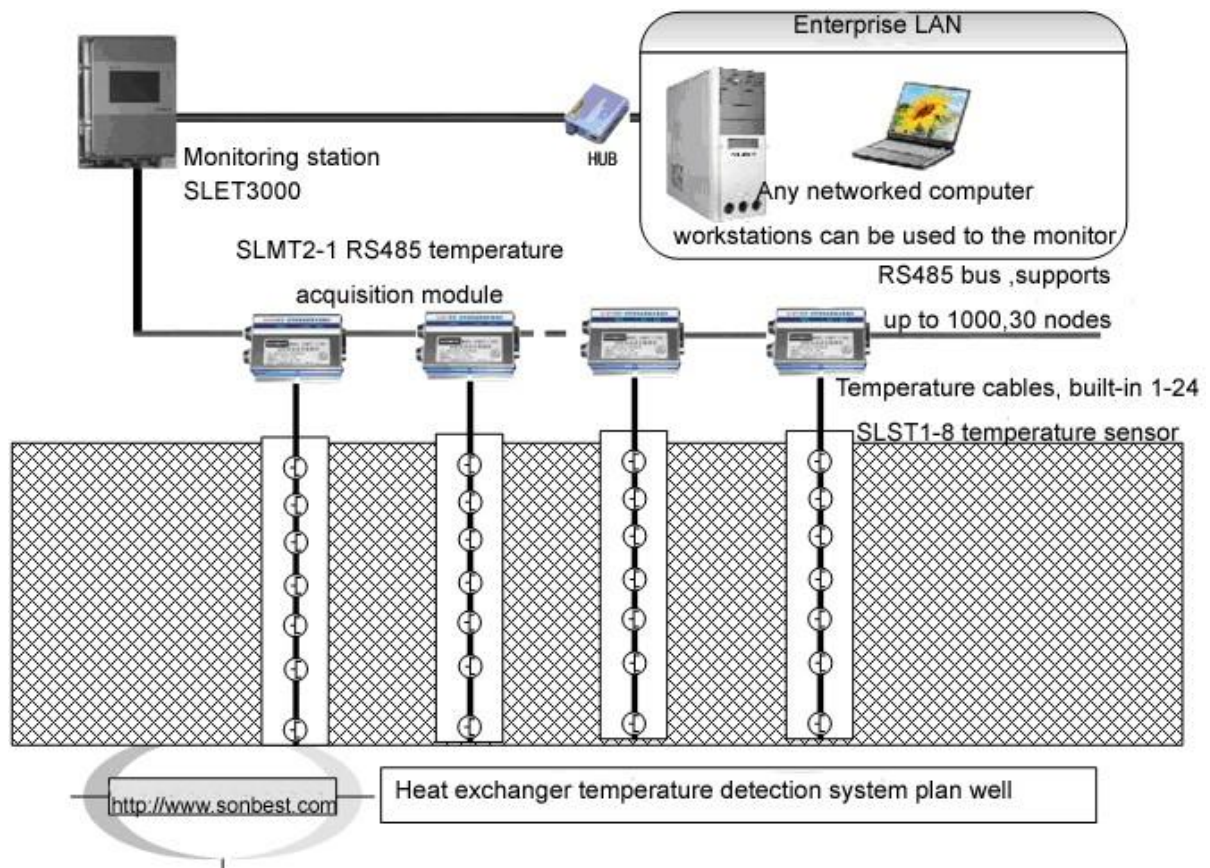
Wiring and system components

Option One: CANopen field bus formed by the long-term real-time monitoring system.



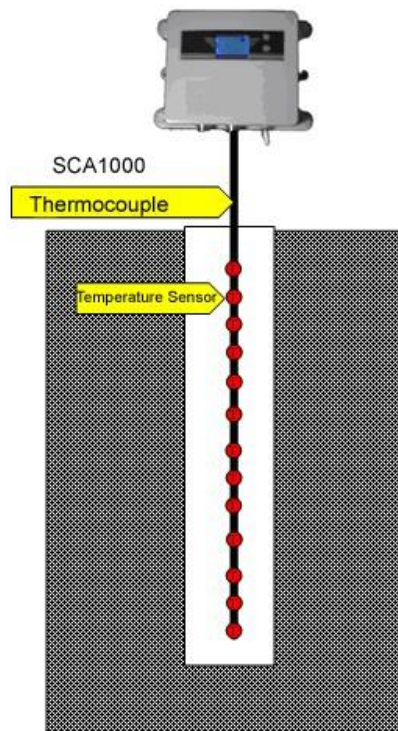
Program shown above, SLET3000 acquisition server will live through the CAN bus is connected with the temperature acquisition module, the temperature acquisition module via a single bus to the temperature sensor to the data to the CAN bus. Each CAN module (SLMT3-1) can be connected to built-in temperature sensor 1-24 SCA1000 temperature cable. The program can be real-time monitoring the temperature of large testing ground to support the 90 wells or above the temperature cable and 500-line monitoring of the temperature observation wells.

Option IIRS485 field bus with real-time monitoring system set up long-term



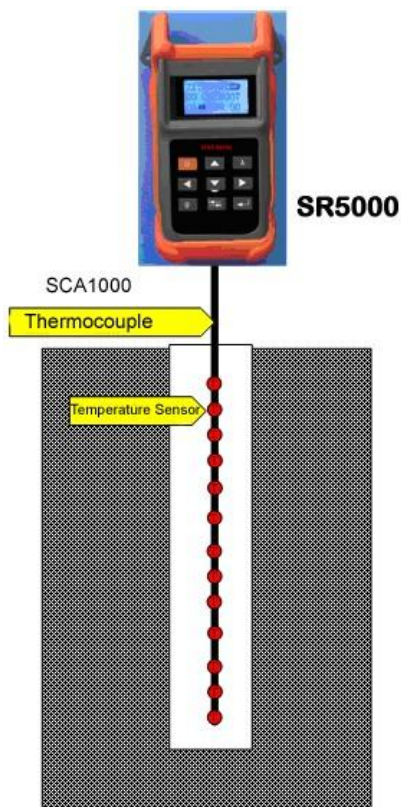
Program shown above, SLET3000 collection server through RS485 bus to the scene and the temperature acquisition module connected to the temperature acquisition module via a single bus to the temperature sensor to the data to the RS485 bus. Each RS485 module (model SLMT2-1) can be connected to built-in temperature sensor 1-24 SCA1000 temperature cable. The program can be real-time monitoring the temperature of large testing ground to support the 15 wells or below the temperature cable and 100-line monitoring of the temperature observation wells.

Option III Observed with real-time indicator



As shown above, only one indicator SR1000 and SCA1000 temperature cable, you can view real-time temperature to the temperature at different depths within the pipe.

Option IV Short-term observations with records and record keeping



You can use the recorder SR5000 field temperature data, short-term (10 days connection record), because the recorder built-in lithium battery, operation without power, the scene is saved, you can always connect the computer and the data analysis of lead into the EXCEL table.

Caution

Water temperature and testing the cable has been tested, with some water and pressure resistance capacity, use, follow the method of operation and use of:

1. Use, the recommended temperature cables placed inside the U-shaped tube to facilitate later maintenance.

If the home with the U-shaped tube, so be careful and do cable protection, to prevent the cable during installation was scratched in order to maintain water pressure resistance of cable capacity and service life.

2. Cable stainless steel body of the sensor location, due to the change in temperature is slow, normal use, please wait for test materials were measured after thermal equilibrium.

3. A three-wire cable bus mode, red for power is, the proposed power supply is 3-5V DC, black for the power of negative, blue for the signal line. Please follow this instructions strictly wiring operation.

Ordering Information

Type	Description	Order	Remarks
SCA1000	Thermocouple	SCA1000-XX-BB	The total number of built-in sensor XX, BB Cable length



ShangHai Sonbest Industry Co.,Ltd

Tel: +86 021 51083595

Website: <http://www.sonbest.com>

ShangHai , China